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## A Matrix of Feedback for Learning

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## **A Matrix of Feedback *for* Learning**

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*Abstract: The present study used an established model of feedback (Hattie & Timperley, 2007) as a framework to explore which types and levels of feedback are most common in the upper primary classroom. Results demonstrate that feedback was predominantly directed toward the task level and that feed forward, information about the next steps for learning, was the least occurring feedback type in the classroom. Based upon research and findings, the authors propose a conceptual matrix of feedback that bridges research to practice with the aim of feedback being a driver to promote improvement.*

### **Introduction**

The use of feedback is regarded as one of the most powerful strategies to improve student achievement (Hattie, 2009) and as such, is garnering much attention in education policy and practice in Australia. For instance, the Australian Professional Standards for Teachers (Australian Institute for Teaching and School Leadership, 2014) lists the effective provision of feedback as one of its key standards. Whilst teachers have been found to give much feedback, their students report they receive little feedback that is helpful to learning (Hattie, Gan, & Brooks, 2017). Thus, it is the quality rather than the quantity of feedback that is vital for feedback to be received and used by the learner. Calls have been made for further investigation into ways that feedback can be made more effective for students (Hattie & Gan, 2017; Shute, 2008). The present study used an established model of feedback (Hattie & Timperley, 2007) as a framework to answer the research question: which types and levels of feedback are most common in the upper primary classroom? The model delineates feedback first into three types: feeding up; feeding back; and feeding forward and second into four levels: task; process; self-regulatory and self. Based upon research and findings, the authors propose a conceptual matrix of feedback that bridges research to practice with the aim of feedback being a driver to improve student learning outcomes.

### **Feedback and Learning**

Within educational research, feedback has been typically viewed as a one-way transformative process where information is given to the student to cause modification of actions and result in learning (Shute, 2008). Recently, this cause and effect notion of feedback has been challenged as the provision of feedback is, in fact, no guarantee of learning (Brookhart, 2012; Sadler, 2010). Findings demonstrate that much of feedback that is

given by teachers is rarely used and implemented by students (Carless, 2006). Acknowledging such findings, Hattie, Gan, & Brooks (2017) argued that there is a need to reconceptualise feedback in terms of how it is *received* by learners rather than how it is *given* by teachers. Thus, a bidirectional model views feedback as information received and used by the learner to clarify where they are going, how they are going and the next steps in their learning journey (Hattie & Timperley, 2007).

Feedback is typically correlated with high effect sizes ( $d = 0.73$ ) in academic achievement (Hattie, 2009), improvements in student work (Wiliam, 2011), and enhanced student motivation (Narciss et al., 2014). Further investigation of feedback research, however, produces a more complex picture. Kluger and De Nisi's (1996) meta-analysis of feedback was a catalyst for emphasising the highly variable effects of feedback on learning. Of over 600 feedback studies were analysed and more than one third recorded a decrease in performance. A disquieting finding of this meta-analysis was that historically, the negative effects of feedback have been overlooked (e.g., the detrimental impact of praise), which potentially could mask the hidden costs of feedback. The variability of feedback was also captured in Hattie's (2008) meta-analyses of influences on achievement for school aged students with large variance amongst the effect sizes recorded.

In acknowledging the power of feedback to produce varied effects on learning, researchers have proposed principles that encapsulate the conditions for effective feedback. These include the need to: (1) clarify expectations and standards for the learner; (2) schedule ongoing, targeted feedback within the learning period; (3) foster practices to develop self-regulation; and (4) provide feed forward opportunities to implement the feedback and close the feedback loop.

### **Clarifying Expectations and Standards**

Clarifying expectations and standards for the learner is a key pre-requisite for effective feedback practice (Boud & Molloy, 2012; Hattie & Timperley, 2007; Hounsell, McCune, Hounsell, & Litjens, 2008; Nicol & Macfarlane-Dick, 2006). A constructivist paradigm of learning views learners as active agents in the construction of knowledge (Jonassen & Land, 2012) as opposed to passive participants in the learning process (Boud & Molloy, 2012). The clarification of criteria and standards at the beginning or at least during the learning cycle orients learners towards purposeful actions designed to satisfy or exceed the learning intent or goals (Hattie & Timperley, 2007). Feedback pertaining to expectations and standards that arrives at the conclusion of the learning cycle is terminal and of limited value, primarily due to the learner not being given further opportunity to implement the feedback (Wiliam, 2011). Feedback has the potential to be increasingly powerful when the task intent and the criteria for success can be matched to challenging learning goals (Hattie & Timperley, 2007).

Hounsell et al. (2008) cautioned that teachers need to be clear and specific when providing guidance on expectations as they found students can form different interpretations of the learning intent from their instructors. An example of an effective strategy for clarifying expectations and standards is the use of exemplars. Exemplars are particularly effective as they clearly depict the required standards and enable students to make a direct comparison between their own work and the stated standards of the exemplar (Nicol & Macfarlane-Dick, 2006). Students also report they value feedback that is matched to assessment criteria (Peterson & Irving, 2008). In a lower secondary school study, students reported that they valued feedback that referenced objective criteria, that was constructive, and helpful for improvement (Gamlem & Smith, 2013). Crucially, feedback pertaining to the

clarification of expectations and standards lays the platform for students to monitor their own learning progress; a key facet of self-regulated learning (Hattie & Timperley, 2007).

### **Formative Feedback**

Ongoing, targeted and specific feedback received within the current learning period is more powerful than feedback received after learning (Boud & Molloy, 2012; Hattie & Timperley, 2007; Hounsell et al., 2008; Nicol & Macfarlane-Dick, 2006). Hence, formative, rather than summative assessment is a key process for creating opportunities for improvement-based feedback (Wiliam, 2013). Teachers are an expert source of information for feedback and must strive to provide regular, purposeful and constructive feedback that is matched to the criteria for assessment (Nicol & Macfarlane, 2006). Hattie and Timperley (2007) similarly argued that students need consistent feedback to let them know 'how they are going' in relation to the required standards for assessment. Boud and Molloy (2012) call for the provision of regular learning episodes that consistently match the overall criteria and learning intent.

Hounsell et al. (2008) suggest the notion that feedback cannot be given in isolation, rather guidance needs to be provided with the feedback message. This means that students must have clarity about how to act upon the feedback. Further, they advocate for an integrated guidance and feedback loop that features the provision of feedback and supplementary support for learners in how to interpret and act upon the feedback. This is acknowledging that the purpose of feedback is to guide improvement. The condition for ongoing, targeted and specific feedback is reflective of formative assessment practices.

Formative assessment provides learners with opportunities to both receive and implement feedback with a view to improving their work (Wiliam, 2011). The scheduling of formative assessment check points throughout the learning period gives students multiple opportunities to demonstrate their knowledge, understandings and skills. Formative assessment also provides teachers with an evidence base of how their students are tracking towards achieving the learning intent. By comparing the learning intent and criteria for success with students' current learning state (as evidenced by their formative assessment samples), teachers can direct their attention to the gap between where the learner is currently situated in the learning cycle and where they need to be. This is often recognised as the feedback standard gap and the direction of both student and teacher's attention to this gap is fundamental for improvement to occur (Kluger & DeNisi, 1996; Sadler, 2010). Teachers can then draw upon pedagogical practices such as differentiation (Tomlinson, 2014) and scaffolding (Fisher & Frey, 2013) to meet the individual needs of learners before the conclusion of the learning period. Thus, feedback that is specific and targeted to the learner is more likely to be received and used (Hattie & Timperley, 2007).

### **Feedback for Self-regulation**

Self-assessment is a key process within an effective model of feedback (Boud & Molloy, 2012; Hattie & Timperley, 2007; Nicol & Macfarlane-Dick, 2006). Boud (2013) defined self-assessment as firstly, learners distinguishing and applying standards or criteria to their work and secondly, learners forming judgments about the level to which they satisfied such standards or criteria. He asserts that prioritising the former, the identification and application of criteria, is crucial for engaging learners and generating improvement-driven action. By giving too much weight to making judgments, learners may disengage from tasks,

resulting in little action on their evaluation. Evidently, the precursory condition of the clarification of standards and criteria is a prerequisite for effective self-assessment.

Similar to the provision of external feedback, Nicol and Macfarlane-Dick (2006) assert that to develop self-assessment skills, learners must be regularly given self-assessment tasks and activities that promote reflection. They highlight the use of peer feedback as a worthwhile process to help build self-assessment skills. Likewise, Hounsell et al. (2008) refer to the positive benefits of using calibration mechanisms such as self-review test questions, models and exemplars to allow students to compare their work against given standards and, importantly, identify areas for improvement. Self-assessment also forms part of self-regulation where students can direct and monitor actions to achieve the learning intent (Hattie & Timperley, 2007). Thus, students proficient in self-assessment and self-regulation become willing and active seekers of feedback. It is important to be cognisant that the seeking and self-generation of feedback may be mediated by transaction costs such as the effort required, loss of face, and inferential mistakes from misinterpretation of feedback (Hattie & Timperley, 2007).

### **Feed Forward**

Another principle of effective feedback is the provision of feed forward opportunities to close the feedback loop (Boud & Molloy, 2012; Hattie & Timperley, 2007; Hounsell et al., 2008; Nicol & Macfarlane-Dick, 2006). The closing of the feedback loop is crucial as it requires learners to act on earlier feedback that they have received or self-generated (Sadler, 2010). Nicol and Macfarlane-Dick (2006) attest that the effectiveness of feedback may be measured by its influence on student behaviour. Often termed feed forward, this highly valued process is often missing from learning episodes due to delays in students receiving the feedback or misinterpreting the feedback content (Hounsell et al., 2008). Feed forward is heavily reliant on the previously discussed three conditions of effective feedback: the clarification of standards; the ongoing targeted feedback opportunities; and the facilitation of self-assessment practices. Nicol and Macfarlane-Dick (2006) call for teachers to use a feedback cycle of task, performance, feedback and resubmission to ensure the provision of feed forward opportunities. Similarly, Hattie and Timperley (2007) argue that teachers need to build provisions for feed forward into their teaching and learning cycle. When further consideration is given to incrementally increasing task challenge, feed forward opportunities can foster greater improvement in learners (Boud & Molloy, 2012).

### **A Model of Feedback**

Hattie and Timperley's (2007) model (see Figure 1) encompasses the aforementioned conditions of effective feedback and takes into account the differing learning states of students.

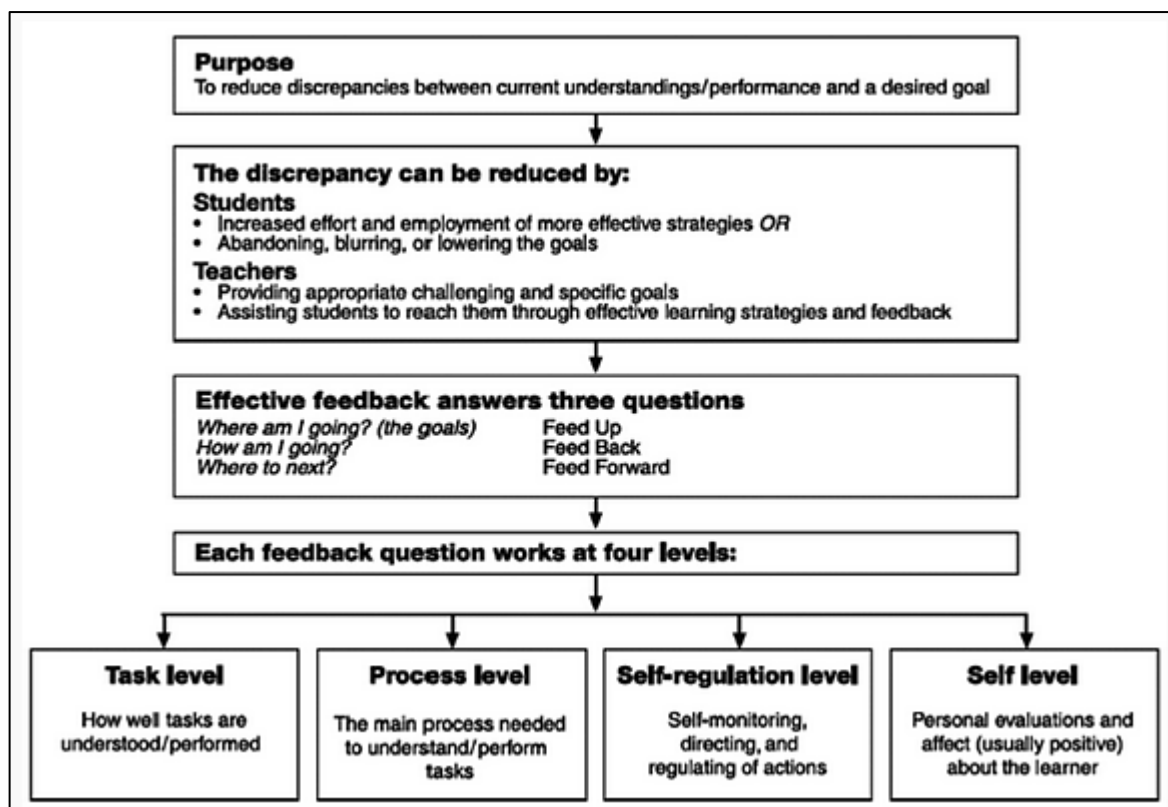


Figure 1: Hattie and Timperley's (2007) Model of Feedback

In an acknowledgment to the finding that a pre-condition for effective feedback requires it to be conceived as information that is received rather than given (Hattie, Gan, & Brooks, 2017), Hattie and Timperley's (2007) model posits three feedback questions from the learner's point of view: Where am I going? (feeding up); How am I going? (feeding back); and, Where to next? (feeding forward). The notion here is that for feedback to be effective, each of these questions must be answered by the learner.

Furthermore, Hattie and Timperley's (2007) model is underpinned by notions of visible learning (Hattie, 2009a). Visible learning involves the clarification of the learning intent, learning goals and criteria for success with students so they can become active participants in the learning process (Hattie, 2009a). Hattie and Timperley's model uses feedback questions such as where am I going, to make the learning intent and criteria for success explicit for students. This helps to lay the platform for students to use self-regulatory learning habits. Visible learning also occurs when teachers perceive student work samples and responses as feedback to them about not only how their students are progressing towards the learning intent, but also as feedback to themselves about the effectiveness of their teaching (Hattie, 2009).

Feedback can be most powerful when it moves in the direction from the student to the teacher (Hattie, 2012) as this provides evidence for the teacher to consider his/her impact upon learning and provides impetus to adjust instruction and future feedback processes. Importantly, this must happen before the conclusion of the learning period if improvement is to occur as feedback received after learning is too late and rarely transferred to new learning contexts (Hattie, Gan, & Brooks 2017). This suggests that, in order for learners to receive feedback information, particularly on how they are going (feed back) and their next step (feed forward), Hattie and Timperley's (2007) model also needs to be situated in a context of formative assessment. Wiliam (2011) defines the purpose of formative assessment to provide evidence for teachers about student achievement in order to make decisions about the next

steps of instruction. Consequently, the effectiveness of teachers' use of the feedback types and levels of Hattie and Timperley's model may be dependent upon the assessment practices of particular learning contexts.

Through the addition of feedback levels, Hattie and Timperley's (2007) model facilitates the targeting of differentiated, specific feedback to individual learners dependent upon their learning needs. Each question works at four feedback levels: task, process, self-regulation and the self-level. Task level feedback is focused upon the learning intent and the specific requirements of the task, whilst process level feedback is aimed at the processes, skills, strategies and thinking required by the learner to complete the task. Self-regulatory level feedback requires the student to use deep learning principles such as relational thinking and self-monitoring to compare and adjust their work in relation to the required standards, criteria or intent. Feedback to the self-level, most commonly associated with praise, was not included in this study due to evidence that it has a detrimental impact on learning (Dweck, 2007; Hattie, 2009a; Kluger & DeNisi, 1996).

Harris, Brown, and Harnett (2015) used Hattie and Timperley's (2007) feedback model as a conceptual framework to investigate which level feedback was directed to during peer and self-assessment. The researchers reported that most feedback was directed to the task level and that self-regulatory feedback only featured in self-assessment. Brown, Harris, and Harnett (2012) concluded that coding feedback into Hattie and Timperley's feedback levels was a suitable form of analysis and suggest further research could be conducted in this area. As such, this study sought to inquire how well the conceptual structure of this model (including both feedback types and levels) applies to practice. The broad research question that asks how a theoretical model of effective feedback applies to practice was refined to determine how Hattie and Timperley's conceptual model of effective feedback applies to the practical conditions of the classroom. To answer this question, a study was designed focusing upon which types and levels of feedback are used in the classroom.

## **Method**

### **Participants and Setting**

This study is based on 28 children (13 females; 15 males) aged between 11 and 13 years and one teacher from a Year 7 classroom at a state primary school in Brisbane, Queensland who participated in the study. Of the students, five were English as Additional Language (EAL) learners. The teacher held 30 years of teaching experience, and was recommended for the study by the school principal as a teacher renowned for developing a positive classroom climate and for having strong positive effects upon academic achievement.

Meadows State School (Meadows SS; pseudonym) is a multi-cultural school with a total enrolment of 825 students. Australian schools are described and compared through the use of an Index of Community and Socio-Educational Advantage (ICSEA); a scale which represents levels of advantage and implicitly, disadvantage.

ICSEA data were included to provide an indication of the socio-economic status of the school community. The ICSEA is explicitly used in Australia to group schools statistically together as 'like schools' for comparative purposes. ICSEA represents levels of educational advantage and implicitly, disadvantage. Meadows SS has an ICSEA value of 1148, which is well above the mean Australian value of 1000. This places Meadows SS in the upper quartile of ICSEA values for Brisbane metropolitan primary schools, indicating high levels of educational and social advantage. It is important to note that socio-economic

status is not defined by ICSEA, rather, socio-economic status is a contributing factor in determining socio-educational advantage.

### **Procedures**

Prior to conducting the study, ethical approval was granted and informed consent was sought from the principal, teacher, and students. Meetings were held between the teacher and the first author to confirm the aims of the research and the protocols to be implemented, with minimal disruption to student learning. Data collection measures consisted of audio voice recordings of classroom writing lessons, supported by field observations from the first author. All observations were conducted during regular English lessons over five weeks, as timetabled by the teacher. Due to contextual constraints at the school, the persuasive writing English Unit was reduced to 12 lessons. Data were captured on a voice recorder worn by the teacher and a second voice recorder was placed in the centre of the classroom. A trial was set up prior to the data collection to provide the teacher and students with the opportunity to familiarise themselves with the research process and instruments, and to test the capability of the equipment. The first author attended the classroom during the 12 English lessons to record the audio data.

### **Data Analysis**

Data from the teacher's voice recorder, comprising 41,179 words (approximately 12 hours of audio) were transcribed into Microsoft Word in preparation for thematic analysis. Using a top down, theoretical approach (Braun & Clarke, 2006), Hattie and Timperley's (2007) model of feedback was used as the conceptual framework to define the themes. Given that Hattie and Timperley describe feedback to the self as potentially having negative effects upon learning, this feedback level was omitted from the analysis. As such, nine possible themes were identified using a matrix of feedback type and feedback level.

### **Coding Protocol**

A coding protocol was designed to aid the consistency of the thematic analysis and to allow for inter-rater reliability. The coding protocol was divided into two stages; feedback type and feedback level.

The first stage sought to identify the feedback type by analysing the purpose of the feedback. Feed Up information clarifies for learners "Where they are going?". This goal natured feedback encompasses both the broad learning intent and the specific success criteria of lessons (e.g. "*I am looking for your ability to persuade your audience*".) Feed back is information to the learner about 'How they are going?' and was defined as any feedback received by the learner that informs them of their current learning state in relation to the learning intent and success criteria (e.g., "*You are using persuasive devices effectively to persuade your audience*"). Feed forward highlights to learners their next steps toward improvement and was defined as constructive feedback that helps bridge the gap between the learner's current learning state and the desired level of mastery of the learning intent and success criteria (e.g., "*You could strengthen your argument by evaluating ideas from the opposing point of view*".)



The second stage of the coding protocol was designed to code the feedback level. The feedback levels were coded by the level to which the feedback is aimed. Hattie and Timperley (2007) identified three effective feedback levels: task level; process level; and the self-regulatory level. Task level feedback was described in the coding protocol as feedback specific to the requirements of the task. Sometimes called confirmatory or disconfirmatory feedback (Hattie, 2012), task feedback is used by learners to gather more information and build surface learning knowledge about the task being completed or product being studied. Examples of task level feedback include, “*No, you need to choose a different point, this is incorrect*”. Process level feedback is defined as feedback that is specific to the processes, skills or strategies required to complete the task. Feedback aimed at the process level often requires learners to relate or extend tasks and is more effective for augmenting deeper learning than that of task level feedback (Hattie & Timperley). Examples of process level feedback include “*Is there a connecting theme between these different points?*” Self-regulatory feedback is defined as feedback that prompts learners to self-monitor, direct and regulate their own progress toward the desired learning intent (Hattie & Timperley). Self-regulatory feedback often features the redirection to self-monitoring strategies or reflective or deep probing questions. Self-regulatory feedback examples include, “*How have you used evocative language to convince your audience*”.

Data were then classified into segments for inter-rater reliability analysis. The segmentation of verbal transcription data is a difficult process in qualitative analysis and requires many constructs to be accounted for including syntax and semantics (Lemke, 2012). Using a procedure similar to that outlined by Strijbos, Martens, Prins, and Jochems (2006) meaningful sentences were used as the defining components of data segments. Data segments were analysed according to whether they were considered to be feedback and if so coded into the appropriate type and level as per the coding protocol. Inter-rater reliability was conducted using Cohen’s Kappa to account for the likelihood of chance agreement when measuring the overall level of agreement between two raters with categorical data (Pallant, 2013). Cohen’s Kappa measure of agreement was 0.62 with a standard error of .026 with  $p < 0.0005$ . According to research on agreement measures by Landis and Koch (1977), this score indicates substantial strength of agreement. Following a review of the coding process, a second portion of the transcriptions was selected for inter-rater reliability analysis resulting in Cohen’s Kappa measure of agreement being 0.66 with a standard error of .022 with  $p < 0.0005$ . The inter-rater reliability was improved and this score indicates substantial strength of agreement (Landis & Koch, 1977).

The coded feedback segments were then analysed according to the relative frequency of each feedback code in relation to total feedback coded within the transcripts. Relative frequency was chosen as a method to report results as it accounted for different transcript lengths and provided a focus on the overall feedback patterns in the data. Relative frequency =  $f/n$  where  $f$  = frequency of individual feedback code and  $n$  = total number of feedback frequencies coded. Relative frequency was reported as a frequency factor where 1.0 = 100%.

## Results

Results were reported according to the relative frequency of feedback type and level coded within the transcript data. Relative frequency results for feedback type (see Table 1) demonstrate that feeding back was the most common feedback type recorded, followed by feeding up and then feeding forward. Relative frequency results for feedback level (see Table 2) report that task level feedback was by far the most prevalent feedback level with a frequency factor more than four times greater than the nearest feedback level, process level

feedback. Furthermore, task level feedback recorded a frequency factor over 12 times greater than self-regulatory level feedback.

<b>Feedback</b>	<b>Feeding Up</b>	<b>Feeding Back</b>	<b>Feeding Forward</b>
Relative Frequency by Feedback Type	.310	.498	.192
Total words by Feedback Type	12,765	20,514	7,900

**Table 1: Relative frequency and total word count of feedback type**

<b>Feedback</b>	<b>Task level</b>	<b>Process level</b>	<b>Self- regulatory level</b>
Relative Frequency by Feedback Level	.778	.159	.063
Total Words by Feedback Level	32,026	6,551	2,602

**Table 2: Relative frequency and total word count of feedback level**

Relative frequency results for the intersection of feeding up type and level (see Table 3), report that feeding up was most commonly directed to the task level, followed by the process level. Meanwhile, self-regulatory feeding up was rarely recorded as evidenced by a relative frequency for this feedback type of 0.01.

Feeding up at the task level was predominantly directed to the whole class and featured items specifically directed to the learning intent; for example, *“So what we have to focus on today is our persuasive argument.”* To a lesser extent, feeding up at the task level also included items pertaining to the success criteria of the task; for example *“That’s what I am looking for. Modality.”* Feeding up at the process level was directed more towards individual students and was characterised by the use of prompts and questions, for example, *“What does that mean? So what’s high modality?”* The limited instances of feeding up at the self-regulatory level were characterised by the use of goals, for example, *“You want to try and challenge an alternative viewpoint.”*

Similar to feeding up, relative frequency results for the intersection of feeding back type and level (see Table 3), demonstrate that task level feedback was predominantly the most frequently observed feedback level. Process and self-regulatory level feeding back, in comparison, were far less frequently observed. Feeding back was largely teacher directed or teacher given, however, peer feedback was also used, particularly for feeding back on student pre-assessment and formative assessment. Task level feeding back, the most common feedback level, was directed to the class, small groups and individuals. It featured confirmatory feedback, for example, *“Yes that is a good one”* and repetition or reinforcement of student responses, for example, *“Yes that’s right because they have to deal with bombings and all sorts of things.”* Process level feeding back was largely focused on the specific English skills of the task and used questions and prompts from the teacher, for example, *“How did this link, how did this link back to her main point?”* Self-regulatory feeding back was predominantly given through teacher prompts for example, *“Linking words, you’ve got the text connectives in your book if you want to have a look at examples just to check.”* It was also given through questions, for example, *“Have you written topic sentences for each paragraph to signpost the information to the reader?”*

Finally, relative frequency results for the intersection of feeding forward type and level (see Table 3), show that task-level feed forward was again the most prevalent feedback level. Self-regulatory feeding forward once again was the least likely feedback level observed. Task-level feeding forward was very specific and often directly stated the students’ next step, for example, *“So why don’t you say something like it’s hard to be safe when you’re living in a war zone is that what you are trying to say?”* Process-level feeding forward was

largely focused on the specific English skills of the task, for example, “*Make your main point in the first sentence, write what you mean in more detail, support it with evidence and then link back to your main point what you are trying to get across.*” Self-regulatory feeding forward was conveyed using teacher guided checklists, for example, “*Then your conclusion does it sum up your argument and restate your point of view. Tick it if you think it does.*”

<b>Feedback Type / Level</b>	<b>Feeding Up</b>	<b>Feeding Back</b>	<b>Feeding Forward</b>
Task Level	0.24	0.42	0.11
Process Level	0.06	0.04	0.06
Self-regulatory Level	0.01	0.04	0.02

**Table 3: Relative frequency distribution of total feedback interactions from classroom discourse according to intersections of feedback type and level**

## Discussion

This study sought to investigate which types and levels of feedback were most frequently used in an upper primary classroom. Findings demonstrate that feed back (information to students about how they are going) was the most common feedback type used in the classroom as opposed to feed forward (information to students about the next steps for improvement) which was the least used feedback type. Feedback was also primarily directed to the task level (aimed at building surface understanding) and subsequently least directed to the self-regulatory level.

Analysis of the feedback interactions in the classroom also raised several important implications. The teacher’s use of pre-assessment appeared to help clarify the learning intent for students; the use of pre-assessment and formative assessment provided opportunities for feedback early in the learning period; and student goals helped to develop self-regulatory behaviours. Findings from this study were subsequently used to inform the development of a feedback matrix that bridges research to practice. The findings and the development of the feedback for learning matrix are discussed below.

### Feeding Back was the Most Common Feedback Type

Results demonstrate that feeding back (feedback that answers the question for learners, how am I going?) was the most frequently used feedback type during the English lessons. Typically feedback follows instruction (Hattie, 2012) which often means that students have to wait to be given opportunities to demonstrate understanding before receiving feedback. In the present study, the use of pre-assessment provided students with opportunities to receive feedback early in the learning period. The feeding back process on the pre-assessment occurred from the beginning of the first lesson of the unit. Tomlinson (2014) asserts that pre-assessment such as diagnostic assessment and pre-tests provide the teacher with invaluable information about the skills and understandings of the students. Furthermore, this feedback to the teacher can also be used to guide planning and further instruction.

The feeding back mode recorded was extensively verbal with comments directed to the students by the teacher. Written feeding back, however, was also given by the teacher and observations were recorded of instances of peer verbal and written feeding back. Brookhart (2012) argues that teachers need to select the feedback mode that will be most effective to ensure the message will be received by the learner. As noted in the results, peer feedback was also used, with this feedback particularly benefiting the student giving the

feedback information, as they engage procedural and higher order thinking strategies (Brookhart, 2012; Hattie, 2012; Sadler, 2010).

Of particular note, feeding forward, information to the learner that answers the question: what is my next step, was the least recorded feedback type. In fact, relative frequency results for this study show that more than twice as many feeding back instances occurred than feeding forward instances. A disparity between feeding forward and feeding back is suggestive that the feedback loop (Boud & Molloy, 2013) is not being completed. This means that whilst students may be receiving feedback about how they are going they may not be receiving feedback regarding their next steps for improvement.

Similar findings were also reported by Peterson and Irving (2008) who found that much of the feedback students received was evaluative or praise driven and did not focus upon areas for improvement or explanations on how to improve. Hawe and Parr (2014) found that not only was most feedback aimed at achievement rather than learning but the quality of the learning-based feedback was not consistently helpful for student improvement.

Likewise, Gamlem and Smith (2013) state that students perceive feedback to be most effective when it includes improvement focused information that clarifies the next steps for learning. Such findings suggest that whilst feedback is being given it is not necessarily used by the learner. This lies at the heart of the problem with feedback (Carless et al., 2011) and it is vital that feeding forward is viewed as not something that is added at the end of feedback, rather it is an innate quality of feedback (Boud & Molloy, 2012). Effective feeding forward or closing the standard gap (Sadler, 2010) requires the learner to have conceptual knowledge of the standards so they can work toward improvement.

In the study, it was notable that the teacher not only used explicit statements of intent, but she also used pre-assessment to provide feeding up information to students. Feeding up clarifies for learners where they are going in terms of the learning intent and the success criteria (Hattie & Timperley, 2007). A common teaching approach is to provide feeding up information to students by explicitly stating the learning intent and success criteria at the beginning of the learning period (Archer & Hughes, 2011; Lysaght & O'Leary, 2013). Boyle and Charles (2010) found that teachers reported the use of specific strategies such as 'we are learning today' (WALT) and 'what I'm looking for' (WILF) statements to tell students the learning intent and success criteria.

Whilst strategies such as these ensure that feeding up information is *given* it does not ensure that it is *received*, and, crucially, *used* by the learner. A persuasive writing task was given at the beginning of the English unit, to effectively clarify for students the learning intent and the success criteria. Cueing the feeding up from the students' pre-assessment sample sought to activate the students in the learning process. The teacher informed the students that the pre-assessment used the same criteria as the final task. Thus the students' performance on the pre-assessment highlights not only what they can do, but importantly what standards they are yet to achieve. This directs both student and teacher attention to the feedback standard gap, the gap between where the student is now and where they need to be, which is a fundamental condition for feedback and instruction to be effective (Sadler, 2010). Feedback to the teacher from the pre-assessment samples can also provide an evidence base for differentiating instruction to best meet the needs of individual students (Tomlinson & Moon, 2013).

### **Feedback was Predominantly Directed to the Task Level**

In the present study, findings demonstrated that most feedback was attenuated to the task level. Similar studies of feedback level in the classroom also found the majority of

feedback was directed to the task level (Gan, 2011; Van den Bergh, Rose, & Beijaard 2013). Task level feedback is used by learners to build surface understanding (Hattie, 2012). Surface understanding is required before deeper understandings and relational thinking processes can be applied (Hattie, 2012). Feeding up at the task level therefore has an important purpose in preparing students for the requirements of the specific task or tasks they are to undertake. It establishes a basis of learning expectations, and provides clarity of success criteria. In this study, such expectations were established early in the learning process by the teacher as she/he explicitly linked feedback from the pre-assessment item to both the tangible criteria sheet and the more intangible learning intent of persuading an audience. Both were then referred to frequently through the unit to guide students towards their learning goals.

Much of the task level feedback was confirmatory or non-confirmatory information to the students about whether they were on or off track to achieve the learning intent. This finding is of interest as conceptual feedback models (Hattie & Timperley, 2007) are centred on the feedback standard gap between the student's current learning state and where they need to be. Hence, error, or an imperfect performance, can become the instigator of corrective feedback and learning. Welcoming error as an opportunity for learning is an important message to be instilled into the classroom culture (Hattie, 2009) where students can feel safe to make a mistake. Whilst the task level feedback helped to keep the students on track to achieve the learning intent, in this case persuade their audience, it remains that the majority of feedback recorded prompted mainly surface learning thinking (Biggs & Collis, 2014). This prompts questions regarding when it may be the optimum time for teachers to use feedback to engender deeper thinking and learning processes. Furthermore, the skew of feedback to the task level also questions the rigour of the learning tasks as this may be suggestive that much of the learning within this study required only surface thinking.

With most feedback directed to the task level, there were comparatively fewer instances of feedback aimed at the process and self-regulatory levels. Again these findings replicate similar studies where firstly, process level feedback was consistently reported to be less frequently occurring to task level feedback (Gan, 2011; Van den Bergh, Rose, & Beijaard 2013). Furthermore, these same studies found feedback was directed to self-regulatory levels on only 1 to 2% of occasions relative to the other feedback levels.

Process and self-regulatory level feedback is used by learners to build deeper understanding (Hattie, 2012). Lesson transcript data from the present study demonstrates that the focus of the process level feedback recorded was specific to the English skills required for persuasive writing. Process level feedback was used by the teacher to prompt students to use and improve evocative and evaluative language skills to form persuasive arguments. Arguing and justifying are classified as deeper level relational thinking skills in the SOLO taxonomy (Biggs & Collis, 2014). An interesting observation is that in comparison to task level feeding back, much of the process level feeding back was directed through questions such as "*Did it convince you? How? How are you positioning yourself? Why didn't you get persuaded?*" Wiliam (2011) notes that questioning has two important benefits in the classroom. Firstly, questions implicitly cause thinking in students and secondly, student responses provide the teacher with information about the learner's current understanding in order to guide reflexive instructional practice.

Whilst feedback directed to the self-regulatory level was the least frequent feedback practice recorded in this study, the self-regulatory feedback was largely centred on the use of student goals. The goals were derived from the success criteria which had the benefit of directing student attention toward satisfying or exceeding the learning intent. This helped to ensure students were on track to succeed. For example, "*Has anyone got something really specific that they want to achieve tomorrow? Tell me what yours is Yosinta? You want to try and challenge an alternative viewpoint? Ok. Good.*" Importantly the goals used by the

teacher in this study were focused upon the standards or success criteria of the English task. These goals would fall within the definition of mastery goals rather than performance goals (Senko, Hulleman, & Harackiewicz, 2011) which may instead, for instance, be aimed at the achievement of a particular grade, for example an 'A'. Mastery goals have been positively associated with increases in student motivation (Brophy, 2010), academic achievement (Hattie, 2009), and deep rather than surface learning (Diseth & Kobbeltvedt, 2010).

Furthermore, based on teacher, peer and self-reflection, students adopted individualised learning goals to frame the next step of their learning progress. This lies in close accord with effective differentiation practices (Tomlinson & Moon, 2013) which advocates for matching the learning level with the proficiency level of the individual learner. The belief that effective teachers must know both the curriculum and their students to close the learning gaps (Hattie, 2009; Marzano, 2007; Wiliam, 2011) resonates strongly with the provision of self-regulatory feeding forward that is targeted at the specific needs of the learner.

### **Implications: A Feedback for Learning Matrix**

The present study found evidence that feedback used during English lessons can be categorised into the feedback types and levels identified in Hattie and Timperley's (2007) model of feedback. Feed forward, information used by the learner for improvement, was the least frequent feedback type observed in the classroom. Similar findings were also reported by Gamlem and Smith (2013) and Peterson and Irving (2008) in their research on student perceptions of feedback, yet they also reported that such feedback that offers guidance and improvement is highly valued by students. Another key finding was that most feedback was directed to the task level whilst comparatively less feedback was directed to the process and self-regulatory levels. This finding is confirmatory of other research on feedback (Gan, 2011; Van den Bergh, Rose & Beijaard, 2013) and is significant given that students use task level feedback to build surface knowledge and process and self-regulatory level feedback to build deeper and conceptual understanding (Hattie, 2012).

Practical examples of feedback, underpinned by evidence relating to the conditions for effective feedback, were also observed during the study. For instance, pre-assessment was used by the teacher to answer all three feedback questions for learners; where they are going, how they are going, and where to next (Hattie, 2012). Effective pedagogies of pre-assessment (Tomlinson & Moon, 2013) and formative assessment (Wiliam, 2011) were also used by the teacher to differentiate both instruction and further feedback. Additionally, mastery goals (Senko et al., 2011) were used to help clarify the learning intent and engender student self-regulatory behaviours.

In response to these findings, and a call for further development of established conceptual models of feedback (Ekecrantz, 2015), a matrix of feedback is proposed that encapsulates the right conditions for effective feedback (see Table 4). The proposed feedback matrix is built upon the reviewed feedback model of Hattie and Timperley (2007) and the aforementioned findings from the present study. The aim of the feedback matrix is to not only provide a conceptual model of effective feedback for teachers, but importantly to provide a conceptual model of effective feedback that can be translated into practice.

Key points of difference between the proposed feedback matrix and Hattie and Timperley's (2007) model include the matrix design structure. The nature of a matrix relies on the relationships between the x and y axis and the proposed feedback matrix intersects feedback types (y axis) with feedback levels (x axis). This results in the matching of the purposeful feedback type with the differentiated feedback level. Reading across the matrix,

the three columns (feedback types) highlight to teachers the importance for each student to have clarity about the learning intent, their individual progress and what they have to do to improve. Reading down the matrix, the three rows (feedback level) illustrate to teachers that learners require different feedback dependent upon their proficiency with the task. Novice learners require specific task-based feedback (surface learning) whilst more proficient learners benefit from more relational process or self-regulatory feedback (deeper learning) (Hattie, 2012). The arrow alongside the three feedback levels visualises the potential of feedback to prompt thinking from surface to deep levels (Hattie & Timperley, 2007).

The feedback matrix proposes to translate theory into practice with the provision of practical example prompts and strategies for teachers at the intersection of each feedback type and level. Feedback prompts are designed upon evidence-based practices from research and those observed in the classroom during this study. Key evidence based prompts and strategies in the matrix include feedback pertaining to: the clarification of the learning intent (Wiliam, 2011), the use of models (Crissman, 2006), sharing of success criteria (Brookhart, 2012), questioning and formative assessment (Wiliam, 2011), the use of strategies and goals (Hattie, 2012) and peer and self-assessment (Nicol & Macfarlane-Dick, 2006; Sadler, 2010).

In terms of implementation it is important to emphasise the ongoing interaction between the three feedback types rather than seeing them literally as boxes to be ticked off in linear fashion. Likewise, the progression of feedback level is non-linear and relies on teachers' use of formative assessment practices to check their students' level of learning. As such, the feedback matrix is a way of encapsulating a model of feedback for learning that teachers could engage with through professional development rather than a how to guide for effective feedback.

Learner Stage	Feedback Level	Feeding Up: Where am I going?	Feeding Back: How am I going?	Feeding Forward: What do I have to do next?
Novice	Task	<b>Feeding Up Prompts:</b> <ul style="list-style-type: none"> <li><input type="checkbox"/> Today we are learning...</li> <li><input type="checkbox"/> Success in this task will look like...(exemplar/model)</li> <li><input type="checkbox"/> The key criteria for success are...</li> <li><input type="checkbox"/> We are looking for...</li> </ul> <b>Feedback Strategies</b> <ul style="list-style-type: none"> <li><input type="checkbox"/> Reduce complexity</li> <li><input type="checkbox"/> Use exemplars/models</li> <li><input type="checkbox"/> Identify misconceptions</li> <li><input type="checkbox"/> Use diagnostic assessment for goal setting</li> </ul>	<b>Feedback Prompts:</b> <ul style="list-style-type: none"> <li><input type="checkbox"/> You <i>have/haven't</i> met the learning intention by...</li> <li><input type="checkbox"/> You <i>have/haven't</i> met the success criteria by...</li> <li><input type="checkbox"/> Your answer/work is/isn't what we are looking for because...</li> </ul> <b>Feedback Strategies</b> <ul style="list-style-type: none"> <li><input type="checkbox"/> Avoid over emphasis of error analysis</li> <li><input type="checkbox"/> Feedback must be immediate</li> <li><input type="checkbox"/> Match feedback to success criteria</li> </ul>	<b>Feed Forward Prompts:</b> <ul style="list-style-type: none"> <li><input type="checkbox"/> To fully meet the learning intention you could...</li> <li><input type="checkbox"/> Addressing the following success criteria would improve your work...</li> <li><input type="checkbox"/> Adding/removing _____ would improve your work.</li> </ul> <b>Feed Forward Strategies</b> <ul style="list-style-type: none"> <li><input type="checkbox"/> Use language from the success criteria</li> <li><input type="checkbox"/> Use scaffolding</li> <li><input type="checkbox"/> Feed Forward must be timely</li> <li><input type="checkbox"/> Use challenge</li> <li><input type="checkbox"/> Refer to goals</li> </ul>
	Process	<b>Feeding Up Prompts:</b> <ul style="list-style-type: none"> <li><input type="checkbox"/> The key ideas/concepts in this task are...</li> <li><input type="checkbox"/> These ideas/concepts are related by...</li> <li><input type="checkbox"/> Key questions you could ask about this task are...</li> <li><input type="checkbox"/> Skills you will need in this task are...</li> <li><input type="checkbox"/> Strategies you will need in this task are...</li> </ul> <b>Feeding Up Strategies</b> <ul style="list-style-type: none"> <li><input type="checkbox"/> Use graphical organisers</li> <li><input type="checkbox"/> Reduce scaffolding</li> <li><input type="checkbox"/> Increase complexity</li> <li><input type="checkbox"/> Use mastery goals</li> </ul>	<b>Feedback Prompts:</b> <ul style="list-style-type: none"> <li><input type="checkbox"/> Your understanding of the ideas/concepts within this task is...</li> <li><input type="checkbox"/> Your thinking about this task is...</li> <li><input type="checkbox"/> You demonstrated _____ skills to a _____ level.</li> <li><input type="checkbox"/> You used _____ strategies to a _____ level.</li> </ul> <b>Feedback Strategies</b> <ul style="list-style-type: none"> <li><input type="checkbox"/> Feedback amount can start to increase</li> <li><input type="checkbox"/> Feedback complexity can increase</li> <li><input type="checkbox"/> Use prompts or cues</li> </ul>	<b>Feed Forward Prompts:</b> <ul style="list-style-type: none"> <li><input type="checkbox"/> You could improve your understanding of _____ concepts by...</li> <li><input type="checkbox"/> Thinking further about _____ could improve your work by...</li> <li><input type="checkbox"/> You could improve your _____ skills by...</li> </ul> <b>Feed Forward Strategies</b> <ul style="list-style-type: none"> <li><input type="checkbox"/> Feed Forward amount can start to increase</li> <li><input type="checkbox"/> Feed Forward complexity can increase</li> <li><input type="checkbox"/> Use prompts or cues</li> <li><input type="checkbox"/> Use challenge</li> </ul>
	Self-Regulatory	<b>Feeding Up Prompts:</b> <ul style="list-style-type: none"> <li><input type="checkbox"/> How will you use the learning intention?</li> <li><input type="checkbox"/> How could you use the success criteria?</li> <li><input type="checkbox"/> Which other ways could you monitor your work?</li> </ul> <b>Feeding Up Strategies:</b> <ul style="list-style-type: none"> <li><input type="checkbox"/> Reduce emphasis of exemplars</li> <li><input type="checkbox"/> Mastery and performance goals</li> </ul>	<b>Feedback Prompts:</b> <ul style="list-style-type: none"> <li><input type="checkbox"/> Are you on track with your work?</li> <li><input type="checkbox"/> How do you know?</li> <li><input type="checkbox"/> To which level are you satisfying the success criteria?</li> <li><input type="checkbox"/> Are you on track to achieving your goal?</li> <li><input type="checkbox"/> How do you know?</li> </ul> <b>Feedback Strategies:</b> <ul style="list-style-type: none"> <li><input type="checkbox"/> Delay feedback</li> <li><input type="checkbox"/> May only require verification feedback</li> </ul>	<b>Feed Forward Prompts:</b> <ul style="list-style-type: none"> <li><input type="checkbox"/> How could you deepen your understandings?</li> <li><input type="checkbox"/> How could you improve your work?</li> <li><input type="checkbox"/> What is the next step for your learning?</li> <li><input type="checkbox"/> How do you know?</li> </ul> <b>Feed Forward Strategies:</b> <ul style="list-style-type: none"> <li><input type="checkbox"/> Delay feedback</li> <li><input type="checkbox"/> Reduce teacher reliance</li> <li><input type="checkbox"/> Develop self-regulated learners</li> </ul>

Table 4: A matrix of feedback for Learning



## Conclusion

Findings from this study on feedback have implications for the classroom. First, feeding up was identified as an important process to help clarify for learners the learning intent and success criteria. Teaching that emphasises feeding up principles can facilitate student self-regulation (Nicol & Macfarlane-Dick, 2006) and enable students to be more likely to receive and use feedback (Hattie & Timperley, 2007). Second, feeding forward, the least frequent feedback type identified, is a vital stage of the feedback process (Quinton & Smallbone, 2010) as it closes the gap between where students are now and where they need to be. Third, most feedback was directed to the task level which is associated with the promotion of surface learning whilst relatively little feedback was directed to process and self-regulatory feedback which are more likely to engender deeper and relational learning (Hattie, 2012). This raises key questions for future research. For example, in acknowledging that task level feedback is required to help construct foundations for further skills and understanding, when should teachers shift feedback from task to process or self-regulatory levels to maximise learning? What role does formative assessment play in helping teachers to make reflexive and informed decisions about matching targeted feedback to the requirements of learners? Further research is proposed to investigate the effect of the proposed feedback matrix on student learning outcomes.

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