

# **Self-Assessment in Learning: The Relationship Between Active Feedback Strategies And Metacognitive Development**

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## **Abstract**

The aim of this action research study was to test the hypothesis that students who take an active part in the feedback process will increase their metacognitive development and raise their achievement.

Individuals were given a self-assessment proforma and asked to self-assess their assignments for content and structure, prior to submission. Active engagement with the feedback process was also gained through individuals setting goals for each new assignment based on previous feedback, in an attempt to promote double-loop learning, a strategy purported by Argyris (1982) to increase metacognitive development.

As hypothesised, the study found some evidence to support the central premise that actively engaging with the feedback process increases metacognitive development and raises achievement. However, limitations of the study are recognised and recommendations for further research are put forward.

## **Key words**

Metacognition; Self-regulation; Feedback; Goal-setting.

## **Introduction**

This study was carried out within the Health and Social Care department of a Further Education College. The students were all in their second year of a two-year Business and Technology Education Council (BTEC) Extended Diploma in Health and Social Care. The course demanded regular submission of essay-based assignments, on which the students received feedback. This feedback gave the students an opportunity to improve the standard of their work prior to the summative assessment.

## **A review of existing literature**

The literature review examined a range of existing material in the field of metacognition, including the origins of the concept and major theories and debates. Vygotsky's work in particular will be examined within this review as he believed that the capacity for metacognition cannot be achieved until adolescence (Fox and Riconscente, 2008) and therefore is of greater relevance within Further Education.

Flavell (1999: p. 21-45) defines the concept of metacognition as 'thinking about thinking'. However, Livingstone (1997) argues that defining the complexities of metacognition is not that simple. In an attempt to further elaborate on the concept, Downing (2009) argues that metacognition requires an ability to reflect and analyse thought and then apply this in practice. Fox and Riconscente (2008) support Livingstone's assertions by claiming that although metacognition has been a historically-established concept in the academic arena, it still remains poorly-defined and as such continues to be a valuable area for educational research. There appears to be a need, therefore, for the theoretical underpinnings of the concept of metacognition to be re-examined in order to interpret its current meanings in terms of raising student attainment.

Vygotsky (1978) views mental functioning in the individual through an examination of the social and cultural processes from which it derives (Wertsch and Tulviste, 2003). Furthermore, Forman and Cazden (2003) elicit two important themes that emerge within Vygotsky's theory as the importance of instruction on development and the social foundations of cognition. They continue by exploring the Vygotskian perspective towards cognitive development and highlight the concept of what Vygotsky terms 'The Zone of Proximal Development' (Vygotsky, 1978: p. 86); this being the term that is given to the gap between a learner's actual level of development and that of the learner's potential development when provided with educational support. Through an interpretation of this assertion, providing educational support for students in terms of social interaction, whether that is in the verbal or written form, can be seen as a valuable contribution towards metacognitive development.

In further exploring metacognition, a number of theorists unite in their assertion that metacognitive development requires students to engage in self-regulation, reflective thinking and mastery goal-setting, as well as having a level of self-awareness (Downing, 2009; Ridley et al, 1992; Schutz et al, 1989 cited by Ridley et al, 1992; Weinstein et al, 2000).

Alongside goal-setting and self-regulation as key determinants within metacognitive development, feedback has also been identified as one of the most powerful influences on learning and achievement (Hattie and Timperley, 2007). However, they caution that, in order for feedback to increase metacognitive development, there must be a learning context to which feedback is addressed. Alongside this, the type of feedback given also plays a key part in its effectiveness with the highest effect sizes involving feedback that relates to a given task and how to achieve it more effectively rather than praise, rewards and punishment. In linking feedback with goal-setting and self-regulation, Hattie and Timperley (ibid) suggest that when students develop error detection skills, their own self-feedback aimed at reaching a goal can also be a powerful tool. In a previous study, Locke and Latham (1984) also identified the relationship between goal-setting and feedback, arguing that through the setting of specific challenging goals for students, feedback can be more directed. Hattie and Timperley (2007) do however recognise the complexities associated with goal-setting and feedback, and suggest that when goals are suitably challenging, and when there is a commitment to the goals, a better understanding of the success criteria is able to be shared between learner and teacher.

Concurring with the latter assumptions, Argyris and Schon (1978) also identified the notion that learning involves the detection and correction of errors. They conceptualise this notion as single-loop learning, whereby goals are operationalised rather than questioned. In contrast to this however, Argyris (1982) later espouses the concept of what he terms double-loop learning, which involves the questioning of the learning which underlies the actual goals and strategies, a process in which metacognitive development is further stretched.

The literature reviewed raises a number of important theoretical issues associated with defining the complex nature of metacognition, from an exploration of Vygotsky's emphasis on spoken and written language in supporting instruction, knowledge generation and cognitive change (Faulkner et al, 2003), to an in-depth exploration of the value of self-regulation, goal-setting and feedback as strategies to further enhance metacognitive development, and finally towards the conceptual notions of single and double-loop learning in raising metacognitive development and student achievement.

## **Purpose and aim of research**

Following an analysis of the literature, there appears to be a strong correlation between the development of reflective thinking and self-regulation, goal-setting and feedback in the enhancement of metacognitive awareness and development. Joseph (2010) argues that metacognitive awareness is not apparent in all learners and the very concept of such awareness is being overlooked in classrooms with the instruction, she debates, focused on content as opposed to the strategies with which to learn the content.

The question of how such metacognitive strategies could be introduced into the learning environment in order to raise student attainment gave rise to the basis of the action research undertaken. Through examination of the literature, one area of investigation could be derived from the work of Hattie and Timperley (2007) who argue in favour of feedback as a means to increasing students' abilities. In response to this conjecture, Newell (2002) finds that an individual's self-awareness can be raised through feedback. Taras (2003) however, considers the argument that students view feedback as a teacher-owned endeavour, and the central issue of how to get students to own and be in control of actively using feedback formed the fundamental purpose of the research undertaken. Concurring, Spiller (2012) suggests that by making learners active participants in their learning, metacognitive awareness will be raised.

The aim and purpose of the research, therefore, was to determine the relationship between active feedback strategies, goal-setting and metacognitive awareness in raising student attainment. This was done through implementing a predetermined set of criteria on a self-assessment proforma, with which the learners could self-reflect prior to handing in work, following which active use of the feedback could be used to further enhance metacognitive development within future assignments, by employing double-loop learning strategies.

## **Research Question**

The central research question generated following a review of the literature was: To what degree do active feedback strategies impact on students' metacognitive development?

Based on a review of the literature, the hypothesis put forward for examination was:

Students who take an active part in the feedback process will increase their metacognitive development and raise their achievement.

## **Participants**

The action research project used convenience sampling of one class of students. Teddlie and Yu (2007) argue that this selection method draws on both the accessibility of a sample and a willingness of participants to take part in a research project.

The sample group were 15 Health and Social Care students in year two of the BTEC Level 3 Extended Diploma in Health and Social Care. The sample used consisted of two males and 13 females, all of whom have five GCSEs at grade D and above. The ages range predominantly from 17 to 19, with two participants being 20 and 21, and all 15 were fluent in speaking English. It is recognised that as a non-random sample group, the ability to make generalisations to the general population is limited and extraneous variables such as the quality of instruction needed to be accounted for.

## **Methodology**

This project was planned and subsequently guided using Lewin's model of action research (cited by Kemmis and McTaggart, 2000), whose simple steps were easy to follow and provided a framework within which to work sequentially and logically. Lewin's model

augments the need for an idea to be formulated, and then proceeds in a spiral of steps each composed of planning, action, and then evaluation of the result of the action (Kemmis and McTaggart, 2000). This organised framework enabled the action research project to be carried out within structural boundaries whilst having the flexibility to allow for formulation and generation of new avenues of exploration. Amendments to the original line of thought could be made and further steps to support the action research undertaken.

Voluntary informed consent was gained from the sample group prior to undertaking any research. All participants in the process were given detailed information on why their participation was necessary and were informed of how and to whom the results would be communicated.

All ethical standards were adhered to and all participants in the process were assured that they would be treated fairly and sensitively and an assurance was made that the confidentiality of all participants would be maintained at all times.

The right of participants within the study to withdraw from the research for any or no reason was also communicated. Furthermore, full consideration of the Data Protection Act (HM Government, 1998) was upheld and all information and data gathered was stored and used correctly.

### **Data collection**

In order to ensure triangulation, both qualitative and quantitative data were used.

Closed-question questionnaires were given to students pre- and post-intervention. Rattray and Jones (2007) argue that the design and development of a questionnaire must be supported by a logical, systematic and structured approach, and as such the questions were generated following a review of associated literature. The main research question was also revisited several times in order to ensure the questions remained relevant to the hypothesis being tested (ibid). Prior to undertaking the main study, a pilot study testing the design of the questionnaire was carried out. Outcomes of the pilot study found that the yes/no response was too vague for the respondents who said that at times they wanted to answer 'sometimes'. Furthermore the respondents also raised the issue of the length of the questionnaire which they felt was too long and repetitive. In accordance with the spiral nature of change within Lewin's model of action research, amendments were made following further research into employment of the best methods for writing such a questionnaire. The questionnaire was re-written replacing the yes/no response with a Likert scale and the number of questions was reduced from 20 to 10. McLeod (2008) debates the use of a Likert scale, which, he argues, taps into cognitive and affective components of attitudes. Through using a Likert scale, a fixed choice response format can be used to measure opinions. These ordinal scales, Bowling (1997) suggests, can then be used to measure levels of agreement or disagreement yielding quantitative data which can be analysed relatively easily. However, McLeod (2008) recognises that validity may be compromised through such questionnaires due to social desirability and respondents not telling the truth in order to put themselves in a positive light. Ensuring the questionnaires remain anonymous, McLeod (ibid) suggests, reduces such social desirability bias and as such all questionnaires were anonymous; however, it is noted that due to the small sample group and the researcher 'knowing' the respondents there may still have been bias within the data gathered from the questionnaires. Furthermore, it is also noted that such questionnaires often fail to highlight concerns of participants (Kember, 2000) therefore semi-structured interviews were also undertaken in order to yield qualitative data through the drawing together of emerging themes; these interviews were also undertaken pre- and

post-intervention. Finally, data from the analysis of 30 pre-intervention essay-based assignments were analysed quantitatively in order to determine the Zone of Current Development (Harland, 2003) and a further 30 post-intervention assignments were analysed so that a comparable exploration of the data that emerged pre-intervention could be compared to post-intervention data whilst taking into account the concept of Vygotsky's Zone of Proximal Development.

It was recognised however, that other factors, such as development of researching skills and confidence in essay writing that could have occurred over the two-year programme, needed to be considered in order to attempt as far as possible to exclude such factors from the overall results, therefore only pre-intervention essays from the second year of the programme were examined in order to give a baseline for measurement prior to the intervention.

**The intervention**

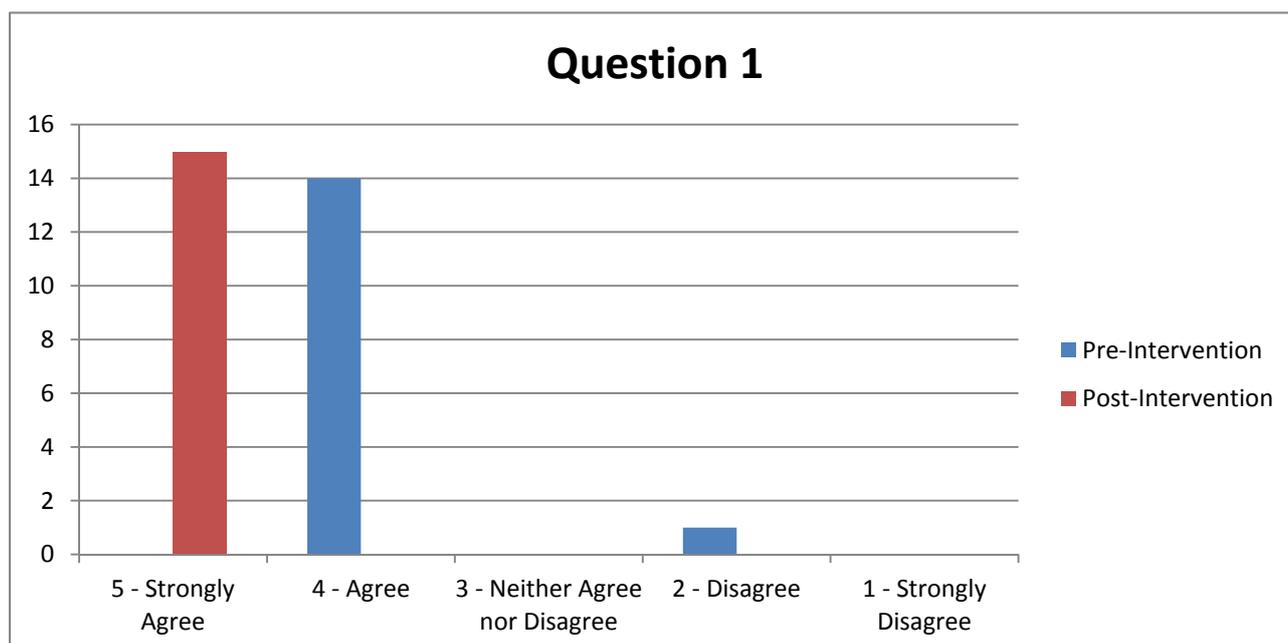
Following a review of the literature, a self-assessment proforma was created, as self-regulated learning is a significant construct in education and crucial to independent lifelong learning (Kriewaldt, 2001) and according to Schraw (1998), assists the students in becoming more strategic and systematic in their progress during an assignment.

Each student was given a self-assessment proforma with every assignment and encouraged to self-assess themselves in order to take control over their own learning. Following this, the respondents' work was marked and constructive feedback given which supported both epistemic cognition and metacognition, and forward-feeding was introduced in order to encourage the respondents to set themselves developmental goals for future assignment writing. These constructs, it was felt, would enhance students' involvement in actively taking control of the feedback and further give rise to double-loop learning strategies, whereby learning systems which underlie actual goals and strategies would be questioned (Argyris, 1982), thus allowing for the hypothesis to be tested.

**Results**

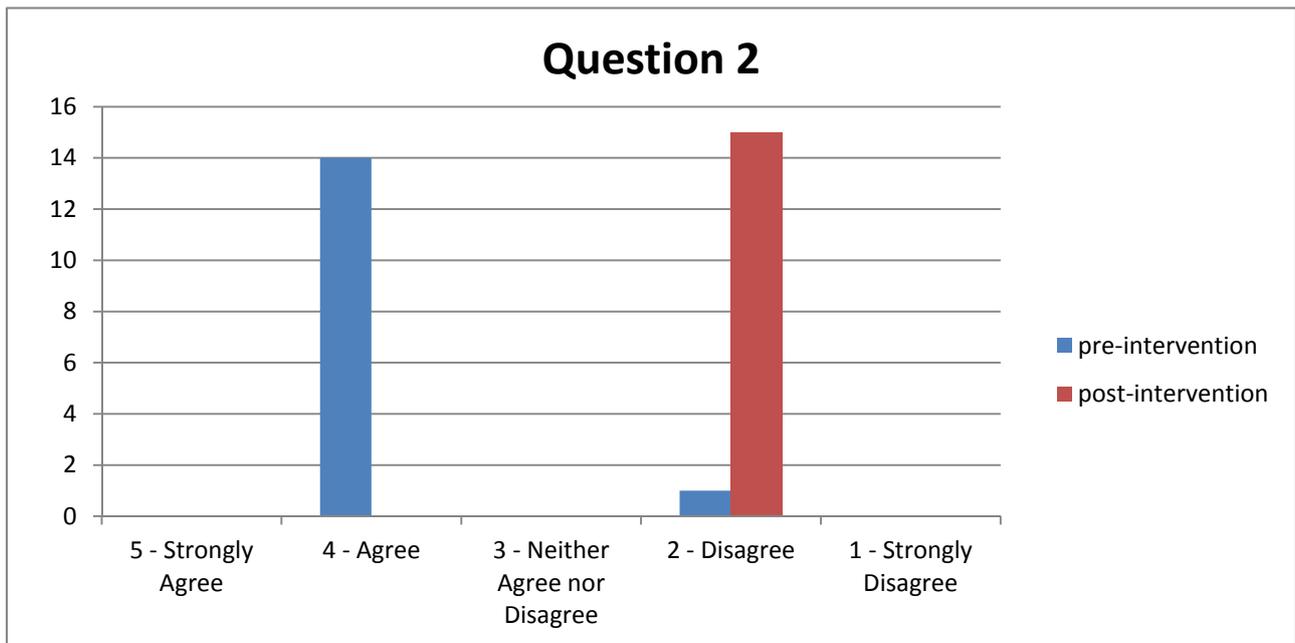
**Analysis of questionnaires**

Q1 When receiving feedback on assignments I like the errors to be corrected in text



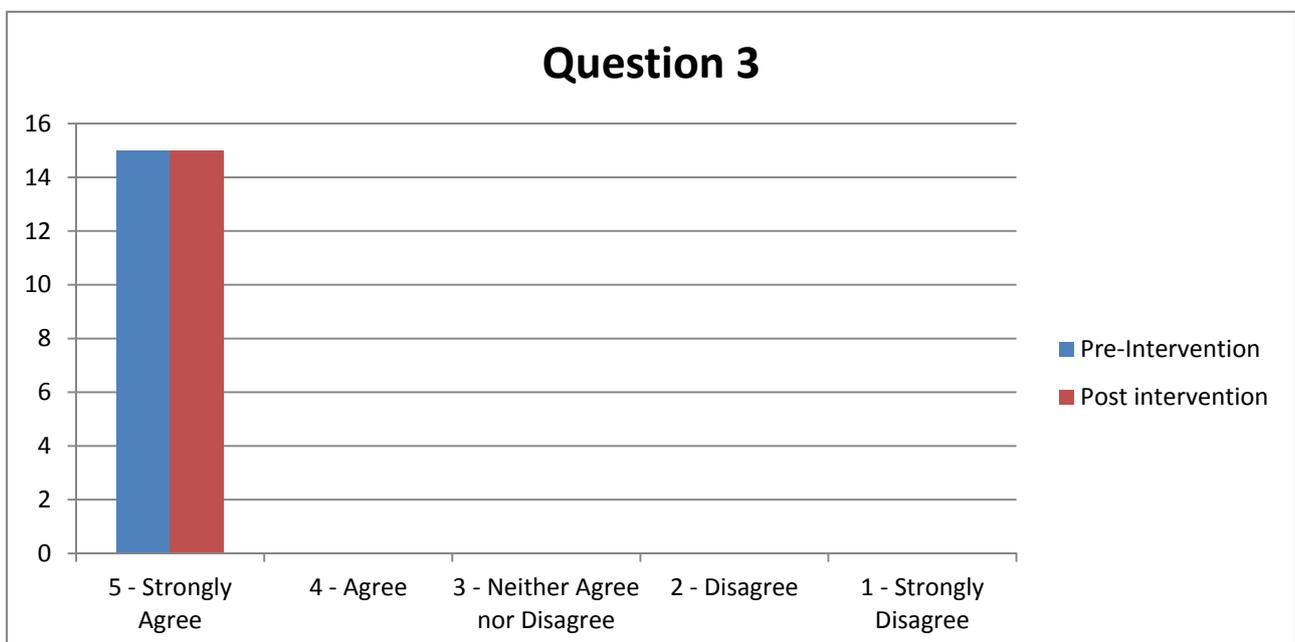
The movement in responses from a 14:1 agree:disagree split to all 15 surveyed (100%) indicating strongly agree demonstrates that the group prefer their errors to be corrected in the text as this is assessing not only their assignment but also their abilities at self-assessing their own work.

Q2 When receiving feedback on assignments I like general comments at the end of the work



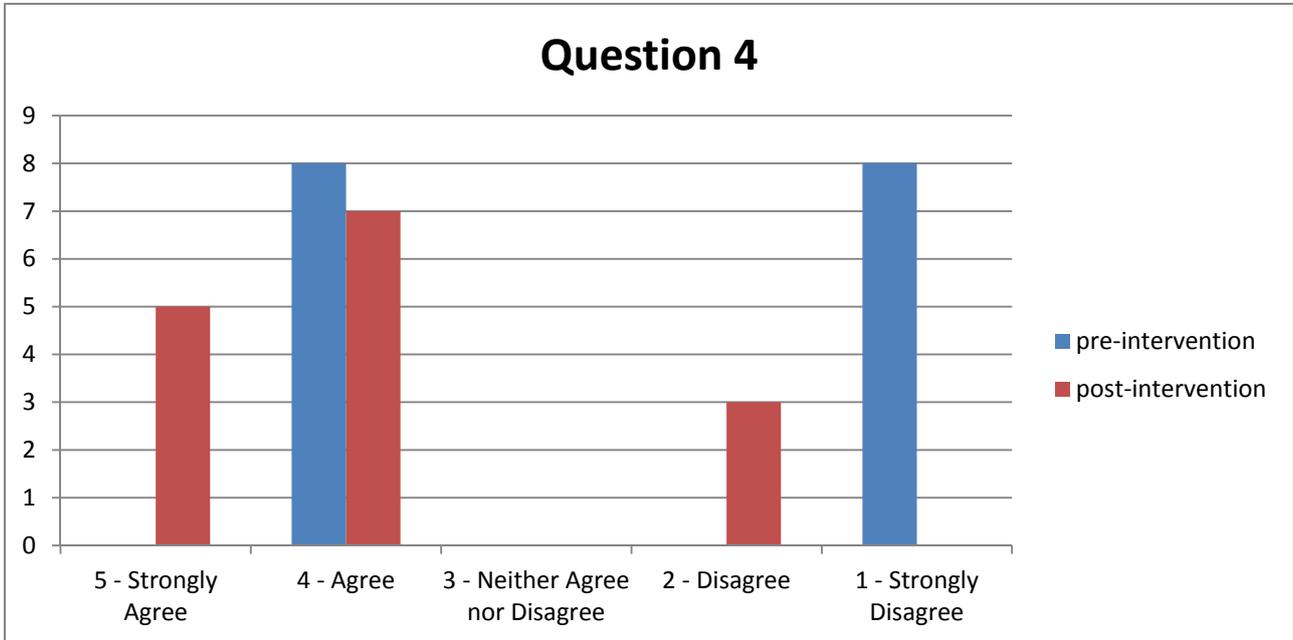
This data set indicates a statistical significance of a 100% shift away from respondents preferring general comments on their assignments such as “expand your answer” and “more detail required”, towards more detailed feedback specific to areas requiring improvement. This finding is supported by Phye and Sanders (1994) who found that general comments are less superior to more specific feedback, arguing that there is a direct positive correlation between specific feedback and enhanced learning outcomes.

Q3 I take time to read the feedback



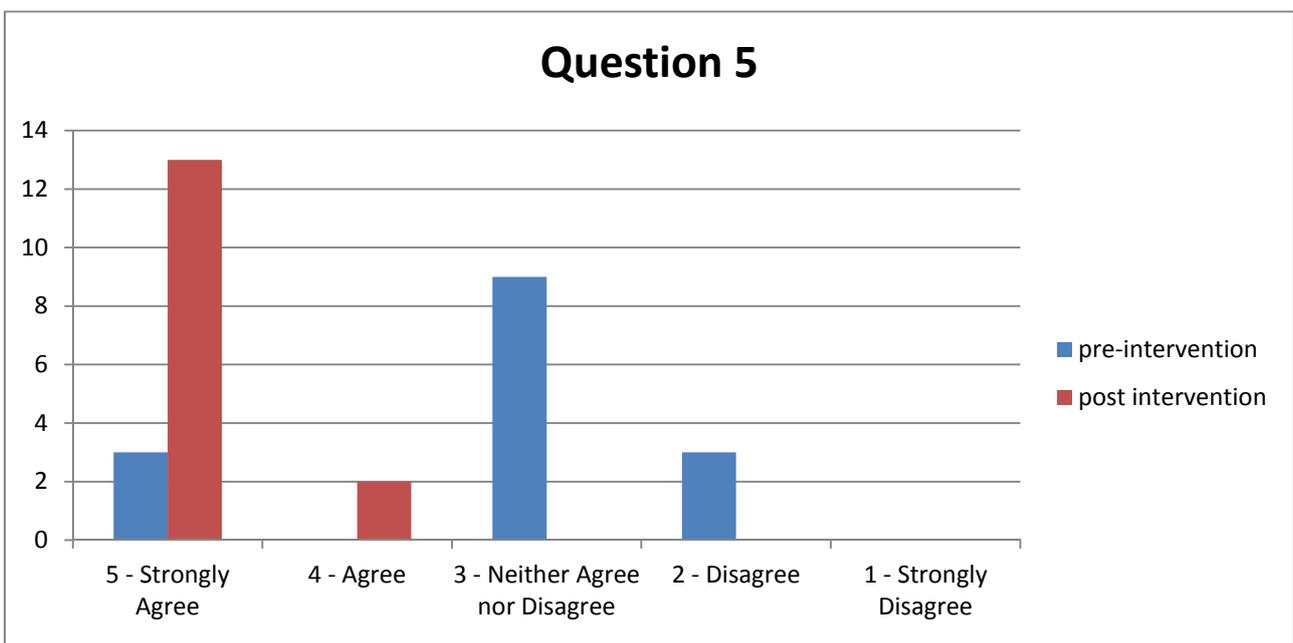
There was no movement in the respondents' answers to this conjecture. However, due to its limitations, the study was unable to determine how the feedback given was encoded and subsequently applied by each of the students in terms of developing their work.

Q4 I look at feedback given on previous assignments before I undertake new assignments



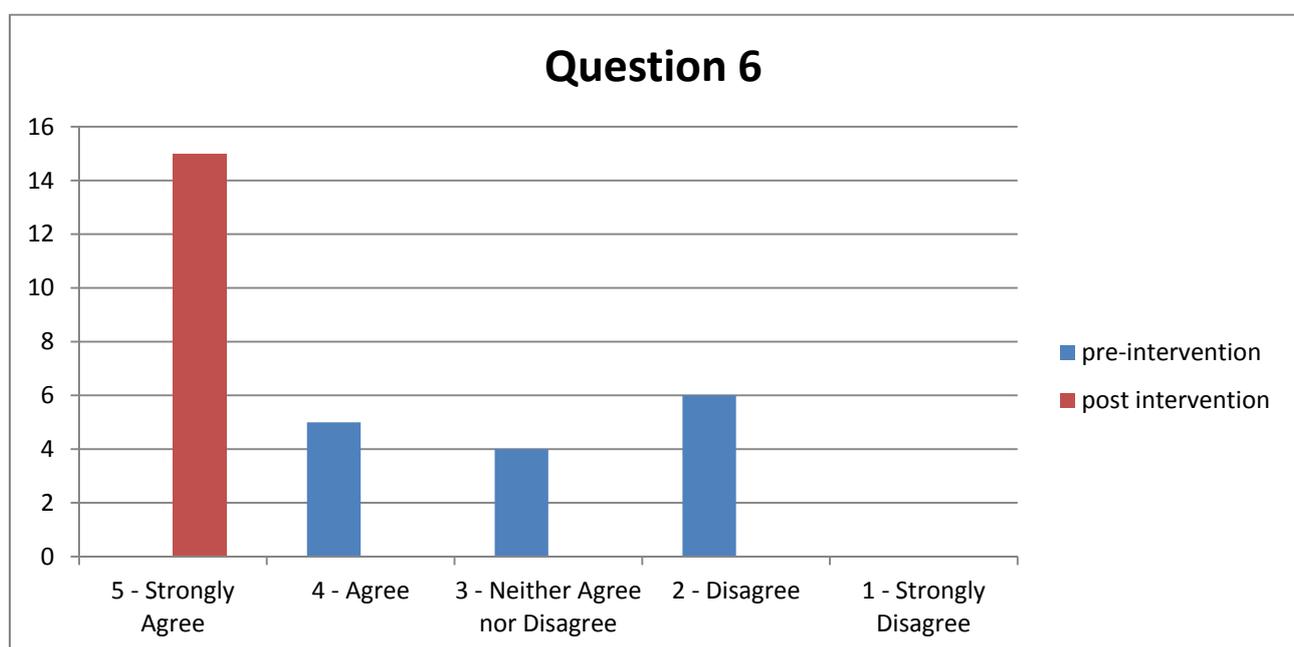
The result of this data is statistically-significant in that it demonstrates a positive shift towards double-loop learning strategies. The pre-intervention data demonstrates that 50% of the respondents did not use previous feedback to inform their subsequent work. However, post-intervention, the results indicate that 80% of the respondents actively used the feedback to inform their future writing.

Q5 I find current feedback specific enough to develop my writing further



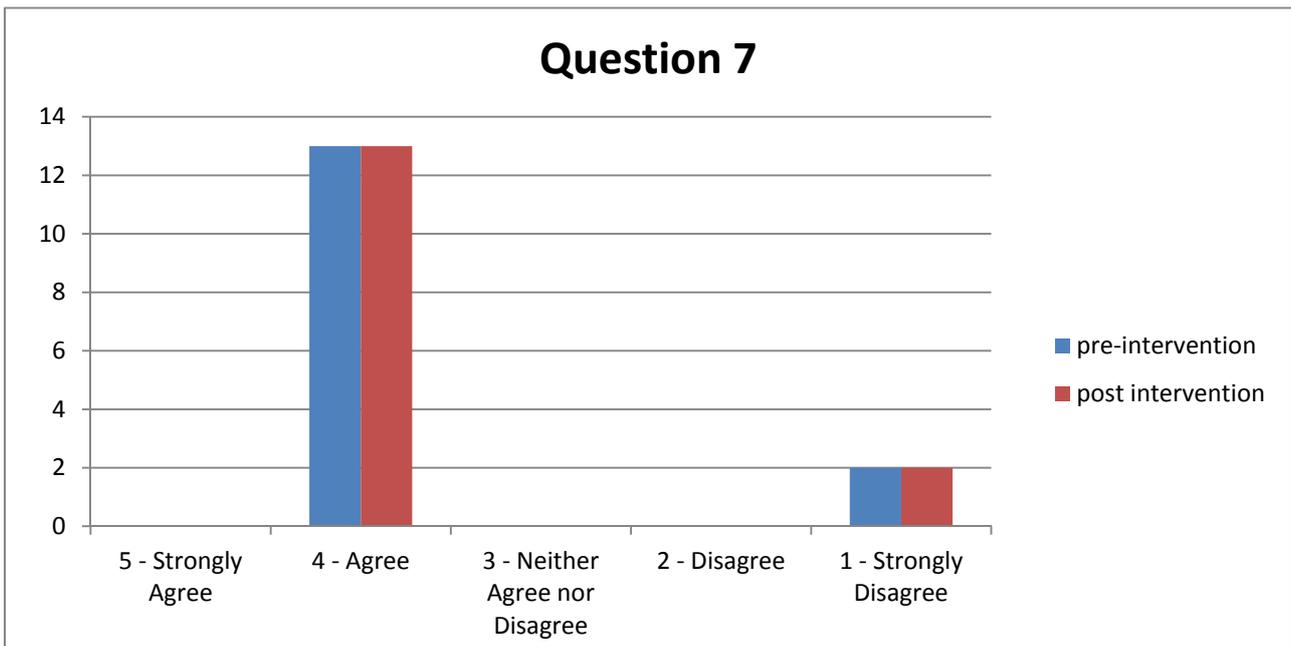
On analysis of this data set, it can be seen that there is demonstrable preference on the part of the respondents towards a more specific focus on feedback in supporting their metacognitive development. Prior to the intervention, 60% of respondents neither agreed nor disagreed with how specific the feedback was, compared to 87% post-intervention who strongly agreed, and 13% agreeing that they found the feedback specific enough to support their development. This result is in alignment with the literature, indeed Williams (1997), cited by Shute (2007), argues that feedback lacking in specificity can often cause students to view it as useless. Such uncertainty, Sweller et al (1998) suggest, can lead to lower levels of learning and furthermore, they argue, reduce motivation to respond to the feedback.

Q6 I find the current feedback instructional in helping me write at Level 3



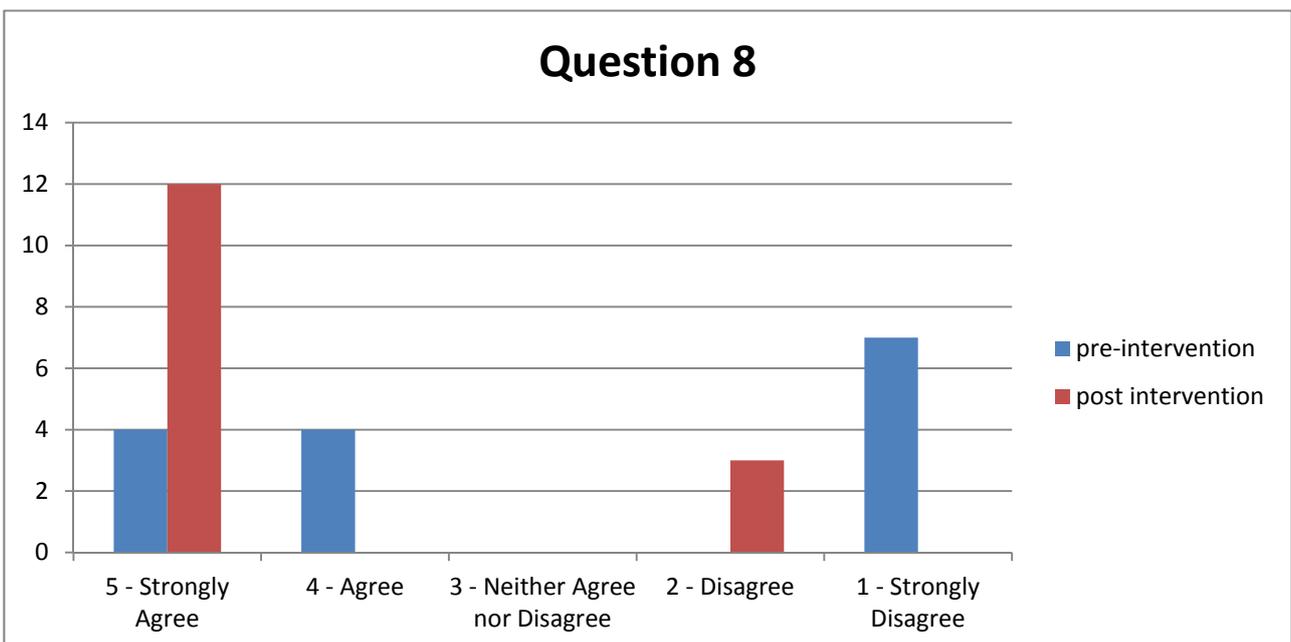
Analysis of this data demonstrates that pre-intervention, 33% of the respondents agreed with the statement, 27% indicated that they neither agreed nor disagreed and 40% disagreed that they were being supported instructionally at writing at Level 3. However, post-intervention, there is significant statistical evidence that demonstrates 100% of the respondents strongly agreed that the intervention had supported metacognitive development. Conversely however, evidence from analysis of the respondents' assignments would suggest that their self-assessment is perhaps based on their perception of what is required at Level 3 as opposed to Level 3 academic expectations. Further research in this area would need to be undertaken and therefore caution surrounding the reliability of this result is noted.

### Q7 I find personal praise an effective learning tool



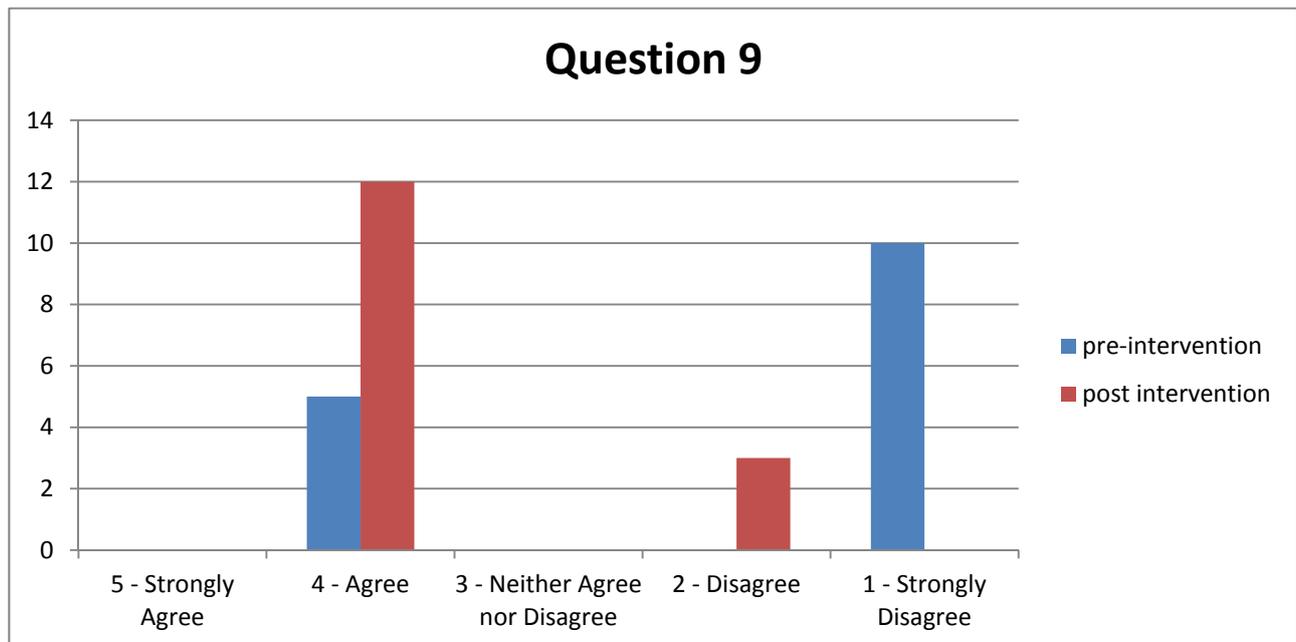
There were no statistical changes pre- and post-intervention within this data. The analysis did, however, demonstrate that respondents do like personal praise within their feedback. Although the students like to be praised, the literature suggests that feedback that relates to praise and rewards has a lower effect size in terms of student achievement than more specific instructional feedback (Hattie and Timperley, 2007). However, Baron (1993) surmises that feedback that is construed as critical can often have a negative influence on learning, therefore it could be argued that despite the null effect of praise within feedback on achievement, it does serve to enhance motivation, and should therefore be offered in combination with specific feedback strategies.

### Q8 I read widely before starting an assignment



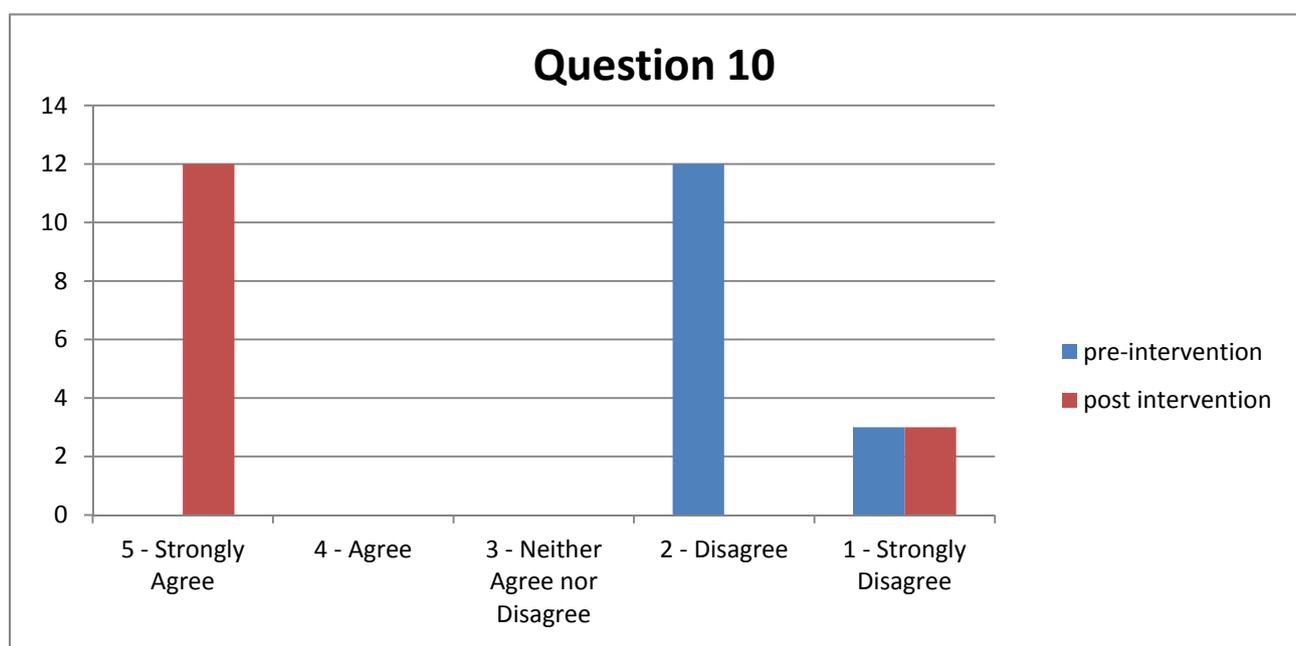
Following analysis of this data set, 80% of students strongly agreed that they had started to read more widely post-intervention as opposed to 27% strongly agreeing pre-intervention that they were starting to read more widely, which may demonstrate an active engagement with feedback strategies.

Q9 I check my work for spelling and grammar prior to handing in



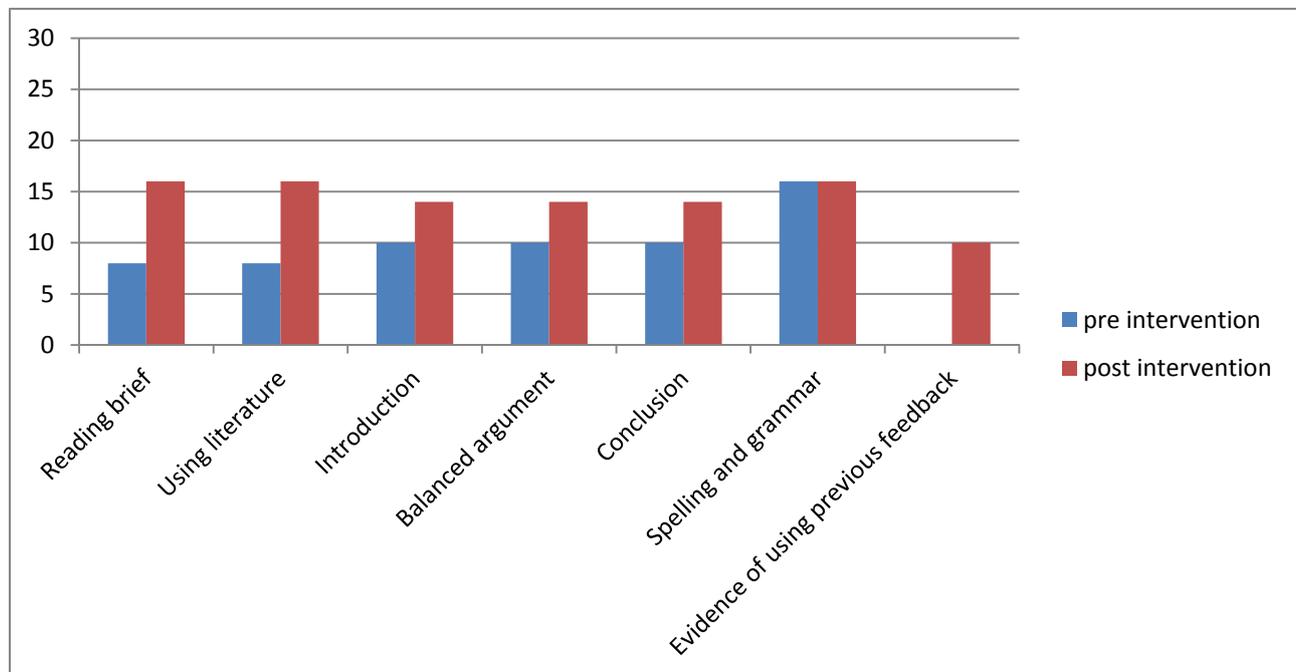
Self-assessment appears to have encouraged more students to self-check their work for spelling and grammar post-intervention with 80% post-intervention now checking their work, as opposed to 33% pre-intervention. However, this result is not congruent with the data analysis from the assignments which suggests that although students may be checking their own work, they are still not fluent in spelling and grammar.

Q10 I set myself goals for inclusion in future assignments which are specific to the feedback received from a previous assignment so that I can improve future work



The results indicate that pre-intervention, no respondents set themselves goals specifically driven by previous feedback, whereas post-intervention, 80% of students stated that they now set themselves specific goals based on past feedback, which it could be argued is a result of forward-feeding strategies.

## Analysis of assignments



Thirty assignments from the respondents were quantitatively analysed pre-intervention and 30 post-intervention, using the self-assessment proforma as a key to examining the essays for structure and content. Comparisons were drawn between the pre-intervention and the post-intervention data. The results demonstrated a significant change in the ability of the respondents to structure an essay. Evidence of using literature to support ideas increased in 50% of respondents, with 16 out of 30 assessed assignments showing an improved ability towards essay structure as opposed to 8 out of 30 pre-intervention. Furthermore, the data demonstrates that evidence of reading and interpreting the brief also increased by 50%. Inclusion of a detailed introduction, demonstrating a balanced argument and giving a justified conclusion showed an increase from 33% to 47%.

However, evidence of correct spelling, grammar and sentence structure remained static with 16 out of 30 assignments both pre- and post-intervention being observant of correct literacy skills within their work. This finding is in stark contrast to the responses from the questionnaire suggesting that although students may be self-assessing, literacy levels need to be addressed further.

Evidence of double-loop learning was starting to emerge post-intervention, with 33% of respondents' assignments having shown evidence of goal-setting and restructuring of the way in which they wrote as a result of forward-feeding strategies.

## Qualitative data results

Results from the semi-structured interviews were analysed by examining emerging themes within the data. Each theme was coded, a method which Foss and Waters (2003) argue as a crucial part of qualitative analysis, and one which entails developing categories and sub-

categories from the raw data. In order to combat the potential reduction of qualitative richness within the data (Qualitative Data Analysis, 2010), respondent statements have been elicited. The semi-structured interviews were guided by open-ended questions asking the respondents to talk about their views on the extent to which they used the feedback given, and what they felt would help them to develop their cognitive skills the most. Such standardisation of at least some of the interview questions increases data reliability as replication is then possible (ibid).

All 15 respondents were interviewed and there were four general themes that emerged within the rich qualitative data: the need for specific instruction within the feedback; support with how to start an essay; how to reference in text; and the need for a checklist as an aide-memoire.

### **Extracts from transcribed semi-structured interviews**

*“Effective feedback to me is specific and concise”*

*“I like examples to illustrate points”*

*“I like feedback that clearly outlines the improvements I need to make”*

*“I used to be upset when I received a lot of feedback but now I realise it is there to help me”*

*“Using the self-assessment checklist has helped me to remember what I need to include in an assignment, and I now check that I have done this much more than before”*

### **Conclusion and future recommendations**

The aim of this study was to test the hypothesis “students who take an active part in the feedback process will increase their metacognitive development and raise their achievement”. This study does appear to offer some evidence to support the hypothesis, and is congruent with the wider literature. As an example, the initial review of the literature Flavell (1999: pp. 21-45) defines metacognition as ‘*thinking about thinking*’ and indeed when the students within this study started to ‘think’ about how to correct their mistakes and engage with the feedback, their essay writing skills improved.

Within this study, evidence has been presented which positively supports the need for feedback to be specific before students actively use and benefit from it. This finding supports the previously-highlighted argument put forward by Hattie and Timperley (2007) that the highest effect sizes with regard to feedback relate to how to improve work rather than praise or punishment-based feedback.

Evidence within this study has been put forward in support of the importance of actively engaging in self-assessment as a central construct in metacognitive development, a concept that was shared by previous studies (Weinstein et al, 2000; Fox and Riconscente, 2008). This evidence suggests that teachers need to promote an environment whereby students are actively encouraged to engage in self-assessment activities. Using a proforma for self-assessment is a good starting point and offers a structured framework for students to be guided by.

There is also some emerging evidence from the data presented to suggest that double-loop learning strategies, which aim to set new priorities by restructuring the norms (Argyris, 1982), were demonstrated amongst the respondents as being crucial to metacognitive development. In particular, students started to engage with, and use, feedback to inform future work which enabled mistakes to be corrected and new norms to be constructed within their writing.

As Vygotsky placed great emphasis on social interactions being central to instruction, generating knowledge and developing metacognition, this study has drawn on his work by encouraging students to be active participants within the developmental process (Greene, 1999). Encouraging such active participation has placed the student at the centre of their learning and enabled them to exert control over their own learning journey.

Finally, it is acknowledged that whilst there was evidence to suggest an increase in metacognitive development post-intervention, progress may have been made due to an increase in the student's confidence in the essay-writing process attained throughout the duration of the programme of study. Limitations such as the sample size and consideration of the potential social desirability bias of the questionnaire responses are recognised and as such the study should not be generalised. Furthermore, due to the limitations on time and methods used, the study was unable to account for extraneous variables such as the complex nature of biological influences and the role of social and cultural backgrounds (Greene, 1999). The relationship between these influences and metacognitive development would be an area for future phenomenological research.

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