The Impact of Process vs. Outcome Feedback on Student Performance and Perceptions

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ABSTRACT

Much has been written in higher education assessing the value of feedback. This article seeks to explore how altering the feedback message might influence student learning and perceptions of learning. Feedback was provided on in-class quizzes in either the process portion or outcome portion of the quiz. Not only did process-oriented feedback have a more positive impact on student performance on quizzes than outcome-oriented feedback, it also was perceived more favorably by students both in terms of its usefulness and its impact on their learning in the class. However, the quiz feedback students received did not seem to generalize to a similar type of analysis question on other types of assessment instruments. This exploratory study suggests further research is warranted regarding the types of feedback provided, the type of assignment/assessment and the type of thinking required.

Introduction

Feedback is an essential component of learning, growth and development. Feedback provides individuals with information about their behavior or performance so they know what needs to be changed in order to improve. In cybernetics systems theory (Frandsen & Millis, 1993), feedback facilitates self-regulation because it identifies a gap between current performance and desired performance. Once the gap is identified, the individual can take action to close or reduce the gap. Thus, whether the feedback is used by employees, students, athletes, or artists, it is a mechanism to enhance learning and/or performance.

The role of feedback in traditional educational contexts has been studied extensively. Despite all that has been learned about the feedback process in general (e.g. Taylor, Fisher & Ilgen, 1984; Ilgen, Fisher & Taylor, 1979; Ilgen & Davis, 2000; Kluger & DeNisi, 1996) and the evidence that feedback enhances student learning in particular (Black & Wiliam, 1998; Hattie & Timperley, 2007), educators still struggle with how to most effectively use feedback to enhance student learning. Potential obstacles include the substantial time requirements associated with providing detailed feedback, uncertainty about what type of feedback will have the most value, and a lack of control over whether the feedback is utilized, either effectively or at all, by the student. In this paper, we will describe a feedback intervention used in teaching fundamental critical-thinking skills in an upper-level college economics class. Although the results are exploratory in nature, they suggest that feedback focusing on the student's thought process may have a more positive impact on learning than feedback focused on the final answer (e.g., Brookhart 2008).

Literature Review

Factors Influencing Feedback Effectiveness

Ilgen, Fisher and Taylor (1979) conceptualized the feedback process as a special case of the more general communication process. Looking at feedback from this per-

spective they argued that the factors influencing feedback effectiveness fit into three broad categories: the feedback source, the feedback recipient and the feedback message. Although their focus was on understanding the use of feedback in performance-oriented organizations, their description of the feedback process applies equally well to feedback in educational contexts. Pokorny and Pickford (2010) help to make that application to education stating, "Effective feedback is positioned as a process of ongoing engagement through the provision of opportunities for self-assessment and dialogue, placing the focus of the process in the classroom and on the delivery of the curriculum (p. 22)." If we examine the prior research on using feedback to enhance student learning, we can see that most of the research either examines the feedback message, which is typically, although not always, delivered by the instructor or the feedback recipient, which, in educational settings, is the student. This study addresses aspects of both the feedback message and the feedback recipient.

The Feedback Message

The feedback message focuses primarily on the content of the information provided to students about their performance. Some of the prior research investigating the feedback message has examined the nature of the feedback comments provided to students. For example, in a descriptive study, Mutch (2003) content analyzed the feedback comments that instructors provided and identified several different ways that these comments could be categorized (e.g. in terms of what was commented upon, the tone of the comment and whether the comment was positive or negative). Other research has compared the effectiveness of different types of feedback. Chase and Houmanfar (2009) compared the effectiveness of what they termed "basic" feedback, where students were simply told that their answer was either correct or incorrect, and "elaborate" feedback where students were also provided with information about why the answer was incorrect. As expected, students demonstrated more learning when provided with elaborate feedback than basic feedback. Black and Wiliam (1998) distinguished between descriptive and evaluative (i.e., grades) feedback and found descriptive comments to be more useful. Lipnevich & Smith (2009) found that providing students with a tentative grade along with comments resulted in lower performance than just providing comments.

These studies tend to focus on providing the feedback message to students at an end point, after an assignment is completed, to assess how well they have done on the assignment, and this feedback is largely directed at content outcomes, including whether or not the learning objective was achieved and involves providing a grade. In contrast to this typical feedback focus, Orlando (2015) and Halvorson (2014) recommend focusing feedback on the process used to reach the final product so that one might call upon that feedback/process to use in future situations. This is because the process is more under the person's control than the outcome and because ultimately, changes in the process are necessary in order to have a better product or outcome. Process-oriented feedback, according to Sadler (1983) is beneficial because it focuses on "growth rather than on grading" as a way to enhance learning (p.60). The recommendation to focus feedback on the process is also consistent with a substantial body of research which finds that feedback showing students how to reach the answer is more effective than feedback about whether the answer provided is correct or incorrect (Kluger & DeNisi, 1996). Our research examines this recommendation empirically.

In an educational context, one way to provide process-oriented feedback is to give students feedback on the thinking process they use in reaching their final answer. This contrasts with outcome-oriented feedback which is directed toward the answer provided by the student. Our research extends the feedback literature by developing an intervention that compares the typical method of providing the feedback message by evaluating the answer, and an atypical method of providing the feedback message by commenting on the critical-thinking process students use to arrive at the answer. Hence, the first research question is:

R1: Will providing feedback to students about the thinking process they used in developing their answer on an assessment improve classroom performance more so than providing feedback to students on the outcome or answer portion of the assessment?

The Feedback Recipient: Student Perceptions of Feedback

As noted above, when investigating the impact of feedback on student performance and learning it is also important to consider the feedback recipient, in this case, the student. Their perception of the feedback they receive will have a significant impact on if and how they respond to the feedback (e.g. Pokorny & Pickford, 2010; Weaver, 2006). Perhaps not surprisingly, research finds that students often do not actually use the feedback they receive (e.g. Glover & Brown, 2006; MacLellan, 2001; Sinclair & Cleland, 2007). This may be partially due to student perceptions that the feedback is not useful (Jonsson, 2012) or that it doesn't enhance their learning. Poulos and Mahony (2008) also emphasize the importance of considering student perceptions when assessing feedback effectiveness. They conducted student focus groups and then did a thematic analysis of the resulting transcripts. Their analysis identified a number of different themes which influence student perceptions of feedback effectiveness. These themes included the timeliness and delivery of the feedback, the significance of the feedback in terms of being useful and contributing to learning, and the importance of basing feedback on grading criteria and of receiving comments in addition to the grade. Their research demonstrates that determining what makes feedback effective is very complex and not necessarily uniform across all students.

Nevertheless, the prior research makes it clear that when evaluating the effectiveness of any feedback intervention, student perceptions of the feedback should be considered. If students don't understand the feedback, don't perceive it to be helpful or don't view it as enhancing their learning, they are unlikely to use the feedback to make changes, which will reduce the impact of the feedback on their performance. Consequently, in addition to looking at the effect of process vs. outcome feedback on student classroom performance, this study seeks to explore and compare student perceptions of these two types of feedback. Specifically, we examine student perceptions of the usefulness of process versus outcome feedback as well as their perceptions that learning occurred as a result of the feedback. Hence the final two research questions are:

R2: Will providing feedback to students about the thinking process they used in developing their answer on an assessment enhance student perception of the usefulness of the feedback more so than providing feedback to students on the outcome or answer portion of the assessment?

R3: Will providing feedback to students about the thinking process they used in developing their answer on an assessment improve their perception of learning more so than providing feedback to students on the outcome or answer portion of the assessment?

We further extend the feedback research by conducting a longitudinal study. Our study takes place over an entire semester and involves giving the students feedback at nine different points in the semester and assessing their learning over that time period.

Method

Sample and Context Description

The subjects for this exploratory study were 48 students (X males and Y females,) in two sections of a 300-level economics elective. All students had completed an introductory principles of microeconomics course as well as an introductory principles of macroeconomics course. The same economics professor taught both sections of the course. Class activities, exams, texts, materials, pace, etc. were the same between the classes. Both classes met two times a week for 75 minutes in the afternoon.

T-tests comparing students in the two sections showed that the two sections did not differ in terms of their gender, major and college. Although students in Section 1 had a higher cumulative GPA and had completed more credits (both cumulative and in the semester in which the study was conducted) compared to the students in Section 2, these differences were not statistically significant (see Table 1).

In terms of content and structure, this course utilized a set of tools and basic framework of analysis to understand various aspects of the employee-employer relationship. The aim was to help students apply basic

Table 1
Descriptive Statistics: Academic Experience

	Section 1 (Outcome-oriented feedback) N=25	Section 2 (Process –oriented Feedback) N=23	Difference in Means (p-value)
Cumulative GPA–Prior Semesters (4.0 scale)	3.305	3.117	-0.188 (0.134)
GPA–Semester of Study (4.0 scale)	3.098	3.000	-0.098 (0.429)
Cumulative Number of Credits–Prior Semesters	101.792	95.478	-6.314 (0.351)
Number of Credits–Semester of Study	18.750	15.609	-3.141 (0.557)
*** Significant at 1%, ** Significant at 5%, * Significant at 10%			

economic analysis to a wide range of strategic personnel problems encountered in the workplace. Emphasis was placed on using this analysis to draw logical conclusions and develop specific managerial recommendations. In other words, the focus was on developing students' critical-thinking skills instead of memorization of certain facts and figures. For each topic studied, the general methodology followed in this course was as follows: (1) introduce the relevant microeconomic theory in class and derive general principles; (2) apply these general principles to current human resource practices using recent newspaper, magazine, and journal articles; and (3) illustrate these general principles using real-world situations from full-length cases. Since this course was also designated as a writing-intensive course, a second objective of the course was to improve students' written communication skills.

Intervention Description

A significant component of the course was a series of nine assigned cases. Combining grades received on case quizzes, participation in case discussions, and case reports, these cases represented 50% of a student's course grade. Thus, students had a strong incentive to carefully read and analyze these cases. Prior to each case discussion, students were given a one-question, essay-based quiz in class. Students in both sections were given similar questions, although not identical in order to prevent the later section from having an advantage over the earlier section. In both sections, students were instructed to spend five minutes brainstorming and organizing their thoughts in the box located at the top of the quiz. During this time, students were not allowed to write in the answer box located at the bottom of the quiz. After five minutes of brainstorming, students were directed by the instructor to write their answer. They were reminded that their score would be based not only on the content and organization of their answer but also on grammar and punctuation. Students were given five minutes to write their answer. Before the quiz was turned in, students were required to proofread it for accuracy and completeness. See Appendix for a sample quiz.

One of the goals associated with the quizzes was to develop students' ability to identify both the positive and negative economic repercussions of pursuing a particular managerial strategy. Doing so would help them to provide a more balanced view of a situation and take into account different points of view. With this goal in mind, the quizzes were divided into three groups:

1. Group I: Quiz 1- Quiz 3
2. Group II: Quiz 4-Quiz 6
3. Group III: Quiz 7-Quiz 9

Group I and Group III quizzes required students to use these desired analysis skills. In other words, there was not a correct answer given the ambiguity in the case. Instead, students were graded on their ability to look at the issue from multiple perspectives. In contrast, Group II quizzes required students to simply describe a particular aspect of the organization highlighted in the case. Of interest in grouping the quizzes in this manner was whether or not improvements in critical-thinking skills early in the semester would be sustained after the change in quiz focus from analysis to description. In addition, a similar type of analysis-based question was included on the midterm exam in order to see whether or not improvements in critical-thinking skills would be sustained after a change in the assessment instrument from quiz to exam.

The quizzes in both sections followed the same pattern, as described above, and answers were graded on the same 5-point scale. However, to assess whether the type of feedback improved outcome, the instructor varied the written comments on the students' quizzes (R1). In particular, students in Section 1 received feedback solely on their answer (i.e. outcome feedback treatment), while students in Section 2 received feedback solely on their brainstorming process (i.e. process feedback treatment).

Measures

The primary dependent variable for R1 was student performance on the nine quizzes as well as their overall performance. Overall performance was assessed by performance on the midterm, performance on the final exam as well as final grade in the class. To examine R2 and R3, at the end of the semester, students were asked to assess the usefulness of the feedback received during the semester (R2) as well as the impact of the quiz feedback on their perceived learning in the class (R3). Note that both feedback usefulness and perceived learning were assessed by 3 items (see Table 4). All items were measured using a 5-point rating scale, with the "1" being "strongly disagree" and "5" being "strongly agree." Additionally, students' perceived effort was measured in order to determine if there were differences in effort or motivation between the two sections. Perceived effort was measured with 3 items, using a 5-point rating scale with "1" being "no/none" and "5" being "a lot". Finally, students were asked for their perception of the main focus of the feedback on the quizzes. This measure was included to determine if students understood the nature of the feedback they received and thus, served as a manipulation check.

Results

Manipulation Check

To determine if our feedback manipulation was successful, students were asked to indicate their extent of agreement with the following statement: "The feedback I received on my in-class quizzes was focused on how I analyzed/processed the information I read." If our manipulation was successful, students who received process feedback should agree with this statement to a greater extent than students who received outcome feedback. As shown in Table 4, this is exactly what we found.

Research Question 1

The first research question examined the impact of process vs. outcome feedback on student learning. We first examined learning as measured by overall performance. T-tests comparing the two sections on performance on the midterm exam, final exam and course grade revealed that despite differences in quiz-related feedback, both sections performed similarly on these instruments (see Table 2).

Given that the difference in feedback between the two sections was confined to the case quizzes, we also examined student performance on the quizzes themselves. These results are summarized in Table 3. For quizzes in

Table 2
Performance on Exams and Overall Course

	Section 1 Outcome-oriented Feedback	Section 2 Process-oriented Feedback	Difference in Means (p-value)
Mid-term Exam Analysis Question	4.200	3.957	-0.243 (0.723)
Mid-term Exam	75.520	73.565	-1.955 (0.413)
Final Exam	67.680	67.739	0.059 (0.984)
Overall Course Average	80.628	80.128	-0.500 (0.763)

*** Significant at 1%, ** Significant at 5%, * Significant at 10%

Table 3
Mean Performance on Quizzes

		Section 1 (Outcome-oriented Feedback)	Section 2 (Process-Oriented Feedback)	Difference in Means (p-value)
Group I	**Quiz 1**	3.636	3.524	-0.112 (0.620)
	Quiz 2	3.818	4.130	0.312 (0.112)
	Quiz 3	3.978	4.368	0.390*(0.062)
	Difference: Quiz 3-Quiz 1	0.292	0.696	0.404* (0.061)
Group II	**Quiz 4**	4.239	4.273	0.034 (0.832)
	Quiz 5	4.659	4.452	-0.207* (0.100)
	Quiz 6	4.560	4.543	-0.017 (0.812)
	Difference: Quiz 6-Quiz 4	0.313	0.261	-0.052 (0.755)
Group III	**Quiz 7**	4.011	4.381	0.370 (0.110)
	Quiz 8	4.359	4.438	0.079 (0.655)
	Quiz 9	4.182	4.638	0.456** (0.024)
	Difference: Quiz 9-Quiz7	0.208	0.143	-0.065 (0.766)
All	**Difference: Quiz 9-Quiz 1**	0.580	0.989	0.409* (0.062)

*** Significant at 1%, ** Significant at 5%, * Significant at 10%

Group I and Group III, we found that the section receiving process feedback performed better than the section receiving outcome feedback on all quizzes except Quiz 1. This difference was statistically significant for Quiz 3 and Quiz 9.

Additional insight into the impact of process vs. outcome feedback on performance can be gained by examining the pattern of mean quiz scores over the course of the semester. As described above, the quizzes were divided into three groups, with Group I and Group III quizzes containing an analysis-based question and Group 2 containing a description-based question. Figure 1 depicts mean quiz scores for Group I (Quiz 1 – Quiz 3), Group II (Quiz 4 – Quiz 6), and Group III (Quiz 7-Quiz 9).

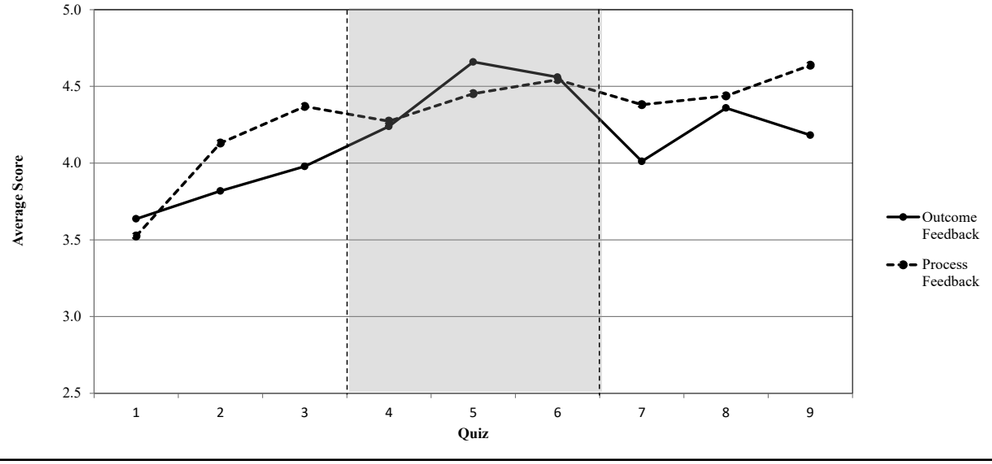
When we look at the change in quiz scores within Group I, we see that students receiving process feedback improved significantly more than students receiving outcome feedback. More specifically, within Group I, although students in both sections improved between Quiz 1 and Quiz 2, the rate of improvement was greater in the section which received process-oriented feedback. Moreover, when we look at the performance difference between Quiz 1 and Quiz 3 we find that students receiving process-oriented feedback improved significantly more than students receiving outcome-oriented feedback.

When the focus of the quiz shifted from analysis to description in Group II, the gains realized by students in the section receiving process-oriented feedback over their peers in the outcome-oriented feedback section dissipated. Our results showed that students in the outcome-oriented feedback section performed similarly to students in the process-oriented section for Quiz 4 and Quiz 6; on Quiz 5, the group receiving outcome feedback performed significantly better than the group receiving process feedback. These results suggest that the outcome-oriented feedback might be more relevant or useful than the process-focused feedback for the less ambiguous, description-oriented, quiz questions.

When students once again were given analysis-based quizzes (Group III quizzes), our results suggest that there was greater retention of previous feedback for students who had received process-oriented feedback. In particular, comparing Quiz 6 and Quiz 7, there was a noticeable drop in the performance of students receiving outcome-based feedback. Students receiving process-oriented feedback did not experience the same sharp decline; in fact, after a slight decline on Quiz 7, their performance continued to increase. Looking at the difference in performance between Quiz 7 and Quiz 9 shows that again students receiving process-oriented feedback improved significantly more than students receiving outcome-oriented feedback. Further, looking at the change in quiz scores across the entire semester (i.e., comparing performance on Quiz 1 and Quiz 9) shows that the section receiving process-oriented feedback improved significantly more than the section receiving outcome feedback.

Although we cannot rule out the possibility that these performance differences were due to pre-existing differences between the two sections, the fact that the two sections did not differ in reported effort or motivation (see Table 4), in their cumulative or semester GPA or in the number of credits completed prior to taking the course suggests that the performance differences on the quizzes is more likely due to the nature of the feedback received rather than to other factors.

Figure 1
Quiz Scores



Research Questions 2 and 3

The second and third research questions focused on student perceptions of how useful the feedback was and its impact on their learning. T-tests comparing the two sections provided some evidence that students who received process-oriented feedback on quizzes perceived that feedback to be more useful in terms of improving their performance in the class than students receiving outcome-oriented feedback on quizzes. The lack of differences between the two sections in terms of perceived usefulness of feedback received on other assessment instruments is consistent with the fact that feedback manipulation only occurred on the quizzes. Students receiving process-oriented feedback also perceived that the quiz feedback had a greater impact on their learning in the class than students who received outcome-oriented feedback (see Table 4). Specifically, although there was no difference between the two sections in terms of perceived impact of the course on writing skills, the section receiving process-oriented feedback reported a greater improvement in their ability to analyze or process what they had read as well a greater awareness of how to use feedback to improve their answers compared to students in the section receiving outcome-oriented feedback.

Table 4
Student Perceptions of Feedback Usefulness and Learning

	Section 1 Outcome-oriented Feedback	Section 2 Process-oriented Feedback	Difference in Means (p-value)
Perception of Feedback Usefulness			
The feedback I received on my in-class quizzes positively impacted my performance in this class.	3.667	4.350	0.683** 0.023)
The feedback I received on my case reports positively impacted my performance on this class.	4.333	4.100	-0.233 (0.352)
The feedback I received on my mid-term exam positively impacted my performance in this class.	3.524	3.750	0.226 (0.462)
Perception of Learning			
After taking this course, I am better at analyzing/processing what I read.	4.048	4.450	0.402** (0.025)
After taking this course, I am better at explaining my thoughts in a written format.	4.095	4.263	0.168 (0.341)
After taking this course, I am more aware of how I use feedback to improve my answers to questions.	3.810	4.368	0.558*** (0.003)
Perception of Effort			
I made _____ effort to improve my writing capabilities in this class	4.095	4.300	0.205 (0.2448)
I made ____ effort to improve my understanding of theory in this class.	3.762	4.100	0.338 (0.135)
I made ____ effort to improve my understanding of personnel applications in this class.	4.048	4.200	0.152 (0.555)
Perception of Type of Feedback			
The feedback I received on my in-class quizzes was focused on how I analyzed/processed the information I read.	3.333	4.200	0.867*** (0.005)
***** Significant at 1%, ** Significant at 5%, * Significant at 10%**			

DISCUSSION

The purpose of this study was to compare the effectiveness of two different types of feedback – feedback focused on the student's thinking process prior to generating an answer (process-oriented feedback) and feedback focused on the student's answer (outcome-oriented feedback). We compared the impact of these two types of feedback on student performance as well as their perception of the usefulness of the feedback and its impact on their learning in the class. Although this was an exploratory study, our results suggest that process feedback may be more beneficial than outcome feedback for more complex analysis-based assignments. Specifically we found that while both types of feedback resulted in performance improvement on quizzes, students receiving process-oriented feedback had significantly greater improvement than students receiving outcome-oriented feedback. They improved more within both groups of analysis quizzes (Group I and Group III) as well as across the entire semester when comparing performance on the first quiz with performance on the ninth quiz. Process-oriented feedback focusing on the student's brainstorming/thinking process may be more beneficial than outcome-oriented feedback because it addresses the more fundamental steps a student needs to take in order to produce a better outcome. Students may more easily perceive the value of this feedback, which would increase the likelihood that they will apply it to subsequent quizzes. When students receive feedback only on the outcome (their answer), they may not be able to translate that information into what they need to change in order to improve their answer on a subsequent quiz, and thus, perceive it as having less value in improving their performance. Furthermore, feedback addressing their answer may have resulted in students focusing only on their grade and not attempting to understand and apply the feedback to the next quiz.

It is noteworthy that the quiz feedback students received did not seem to generalize to a similar type of analysis question on the midterm exam or to the case reports which also required this type of analysis. Students who received process feedback on the quizzes performed the same on the case reports as students receiving outcome feedback and actually performed less well, although not significantly, on the parallel question on the midterm exam. In fact, neither class appeared to be able to transfer learning from the quizzes to either the exams or the case reports. It is not clear why students were unable to apply their learning from the quizzes to other forms of evaluation in the class. It is possible that students did not recognize the similarity between the quiz questions and the exam question and case reports or that they did not realize that they could apply this method of analysis to problem solving in other contexts. Support for this possibility comes from a conversation the first author had with a student in the class who was trying to decide whether to accept a job offer. When it was pointed out to the student that she could apply the same method of analysis used on the quizzes to this situation, the student appeared surprised – she apparently did not automatically see that the situations were similar and thus, did not realize she could apply something she had learned in the class to her personal situation. Helping students to see how they can apply learning from one context to another context would be beneficial. Future research could investigate whether providing students with a prompt that highlights the similarity between an exam question and the previous quiz questions might be sufficient to trigger application of thinking strategies practiced and learned on the quizzes to the exam.

It is interesting that students receiving outcome-oriented feedback actually performed better on the descriptive quiz questions than the students receiving process feedback. Because these questions were less ambiguous, were factual in nature, and thus, were either correct or incorrect, feedback focused on the outcome (answer provided) seemed more beneficial than feedback focused on the process (thinking process). This finding is suggestive that different types of feedback might have more or less value depending on the nature of the assignment and the type of thinking required. Future research might examine this issue by varying the nature of the feedback provided to students on assignments that focus on different levels of thinking in Bloom's taxonomy (Bloom, Englehart, Furst, Hill, Krathwohl, 1956; Anderson & Krathwohl, 2001).

Not only did process-oriented feedback have a more positive impact on student performance than outcome-oriented feedback, it also was perceived more favorably by students both in terms of its usefulness and its impact on their learning in the class. This may be because it showed students what they needed to change in order to perform better instead of simply highlighting what was incorrect with the answer they provided. Furthermore, these students were able to see a more substantial improvement in their performance on the quizzes throughout the semester as they presumably applied, and then benefitted from, the feedback. This would likely have resulted in stronger perceptions that the feedback was enhancing their learning in the class.

CONCLUSION

Taken together, our results suggest instructors may be able to influence both student learning as well as students' perception of their skill development simply by changing the type of feedback they provide to students. They also

generate some additional questions worth investigating further. In particular, is it necessary to require separate brainstorming and feedback in order to obtain the performance improvements that we observed in this study? It may not always be possible or even desirable to require students to brainstorm prior to writing their answer as was done in this study. If students are told that they are being provided feedback on their thinking process and that the purpose of the feedback is to help them improve on *subsequent* assignments, would that accomplish the same thing as having separate brainstorming-related feedback even if that feedback was associated with their answer? Future research could address this question.

As noted above, future research should also address approaches that instructors might use to help students recognize that they can apply thinking strategies practiced in one assignment to other related, but not necessarily identical, assignments. Also important is helping students to recognize the opportunities to utilize the methods of analysis presented for academic materials to non-academic situations. These skills and methods of analysis should enhance effectiveness in work-related contexts but if students do not apply them to these contexts, their value is lost.

Because this study was exploratory in nature and had a small sample, it is not clear if the findings will generalize to other samples and settings. However, our results suggest that further study is warranted. If we better understand what type of feedback is most appropriate for what types of assignments and for what purposes (e.g. for improving what types of thinking skills), we can provide students with feedback that will have more value – both as perceived by students and in terms of impact on student performance and learning.

References

Anderson, L.W. & Krathwohl, D. R. (2001). *A taxonomy for learning, teaching, and assessing: A revision of Bloom's taxonomy of educational objectives*. Allyn and Bacon.

Black, P., & Wiliam, D. (1998). Assessment and classroom learning. *Assessment in Education: Principles, Policy & Practice*, *5(1),* 7- 75.

Bloom, B. S., Engelhart, M. D., Furst, E. J., Hill, W. H. & Krathwohl, D. R. (1956). *Taxonomy of educational objectives: The classification of education goals. Handbook I: Cognitive domain*. New York: David McKay Co.

Brookhart, Susan M. (2008). *How to Give Effective Feedback to Your Students, Association for Supervision and Curriculum Development*, http://www.ascd.org/publications/books/108019/chapters/Types-of-Feedback-and-Their-Purposes.aspx.

Chase, J. A. & Houmanfar, R. (2009). The differential effects of elaborate feedback and basic feedback on student performance in a modified, personalized system of instruction course. *Journal of Behavioral Education*, *18*, 245-265.

Frandsen, K. D. & Millis, M. A. (1993). On Conceptual, Theorectical and Empirical Treatments of Feedback in Human Communications: Fifteen Years Later. *Communication Reports*, 6 (2), 79-91.

Grover, C. & Brown, E. (2006). Written Feedback for Students: Too Much, Too Detailed or Too Incomprehensible to be Effective? *Bioscience Education Electronic Journal*, 7 (3).

Halverson, H (2014) The Key to Great Feedback? Praise the Process, Not the Person. *99U.* Retrieved from: http://99u.com/articles/19442/the-key-to-great-feedback-praise-the-process-not-the-person

Hattie, J & Timperley, H. (2007). The power of feedback. *Review of Educational Research*, *77(1)*, 81-112.

Ilgen, D. R. & Davis, C. A. (2000). Bearing bad news: Reactions of negative performance feedback. *Applied Psychology: An International Review*, *49*, 550-565.

Ilgen, D., Fisher, C., & Taylor, M. (1979). Consequences of individual feedback on behavior in organizations. *Journal of Applied Psychology*, *64*, 349-371.

Jonsson, A. (2012). Facilitating productive use of feedback in higher education. *Active Learning in Higher Education*, *14(1)*, 63-76.

Kluger, A. N. & DeNisi, A. (1996). The effects of feedback interventions on performance: Historical review, a meta-analysis and a preliminary feedback intervention theory. *Psychological Bulletin*, *119*, 254-284.

Lipnevich, A. A. & Smith, J. K. (2009). Effects of differential feedback on student's examination performance. *Journal of Experimental Psychology: Applied*, *15(4),* 319-333.

Maclellan, A. (2001). Assessment for learning: The differing perceptions of students and tutors. *Assessment and Evaluation in Higher Education*, *26(4),* 307-318.

Mutch, A. (2003). Exploring the practice of feedback to students. *Active Learning in Higher Education*, *4(1)*, 24-38.

Orlando, J. D. (2015) Is Praise Undermining Student Motivation, *Faculty Focus*, Jan. 15, 2015. Retrieved from:

http://www.facultyfocus.com/articles/educational-assessment/praise-undermining-student-motivation/.

Porkorny, H. & Pickford, P. (2010). Complexity, cues, and relationships: Students perceptions of feedback. *Active Learning in Higher Education*, *11(1)*, 21-30.

Poulos, A. & Mahony, M. (2008). Effectiveness of feedback: The student's perspective. *Assessment and Evaluation in Higher Education*, 33(2), 143-154.

Sadler, D. (1983). Evaluation and Improvement of Academic Learning, *Journal of Higher Education, 54(1),* 60-79.

Sinclair, H. K. & Cleland, J. A. (2007). Undergraduate Medical Students: Who Seeks Formative Feedback? *Medical Education*, 41 (6) 580-82.

Taylor, M. S., Fisher, C.D. & Ilgen, D. R. (1984). Individuals reactions to performance feedback in organizations: A control theory perspective. *Research in Personnel and Human Resources Management*, *2*, 81-124.

Weaver, M. R. (2006). Do Students Value Feedback? Student Perceptions of Tutor's Written Responses, *Assessment & Evaluation in Higher Education*, 31(3), 379-394.

Appendix
Sample Case Quiz

Stephen Connor, research director at RSH, is faced with the challenge of replacing a star semiconductor analyst, Peter Thompson. Each of the five potential candidates possesses certain critical skills, experiences and relationships and lacks others.

- Would you recommend hiring Sonia Meetha? Why or why not?
- Brainstorm and Organize Thoughts (must fit in the box below):
- Answer (must fit in the box below):