Classroom Discussion in Intermediate Macroeconomics: Does the Use of Interpretative Question Clusters Impact Student Learning?

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Abstract

This paper investigates whether the format of class discussion impacts student participation in discussion and their absorption of discussion material. In an intermediate macroeconomics course where, in addition to lecture classes, students meet once a week in three smaller groups for discussion, three different teaching methods are utilized. In one session, the discussion is based on interpretative question clusters (Salemi – Hansen), in another, discussion is unstructured and in the third, a traditional lecture format is used. The focus of these sessions is material from N Gregory Mankiw's Fall 2006 paper "The Macroeconomist as Scientist and Engineer" in the Journal of Economic Perspectives. An assessment exercise is assigned directly after each session and a follow-up assessment is included on an exam several weeks later. Students' performance and learning outcomes are evaluated and compared to ascertain any differences between the group that received the question cluster treatment and the two controls. The aim is to determine whether, compared with listening to a lecture, student learning is enhanced to a greater degree when structured discussion question clusters are utilized compared with an unstructured discussion with open-ended questions. This experiment is implemented twice - in the Spring and Fall semesters, 2008 at Smith College in classes of approximately 40-50 students. While the empirical evidence is limited by the small class sizes, the approach taken has the advantage of enabling comparisons across students in the same class. Preliminary evidence points un-ambiguously to an impact of the discussion format on the extent and nature of students' participation, the impact on student learning outcomes is less clear.

1. INTRODUCTION

Widespread agreement exists that the active participation of students during class promotes higher order learning[1]. One way to promote this type of participation is through classroom discussion, where students actively share their viewpoints on the topic at hand. This paper investigates whether the particular format of the discussion impacts the outcome for students. Specifically, it compares the in-class experience and learning outcomes for sub-groups of students from the intermediate macroeconomic theory classes taught at Smith College during the Spring and Fall semesters, 2008. In each semester, three different techniques were used when discussing Mankiw's Fall 2006 Journal of Economic Perspectives article "The Macroeconomic as Scientist and Engineer". In one section, the discussion was somewhat unstructured, where the students were provided with three general questions to guide their reading. In a second section, the discussion focused around interpretive question clusters, following the technique suggested by Hansen and Salemi (1998). The final section consisted as a lecture where the material was presented to the students using power point. By comparing the experiences of each sub-group of students, the paper investigates whether

- The format of the discussion influenced the degree of student participation
- The format of the discussion influenced the nature of student participation
- Student learning and retention of the material was influenced by which section they attended
- Students' perceptions of how much they were learning were influenced by the technique used in the section they attended
- The differences across sections arose from the discussion versus lecture distinction or across the format of the discussion.

[1] See Salemi and Hansen (2005) pp.2-5 for a discussion of the literature.

The structure of the intermediate macroeconomic theory course at Smith College includes three smaller section meetings each week in addition to the main lecture. This facilitated the implementation of this experiment, as it provided an opportunity to examine the impact of the structure of the smaller sections across a group of students who were at a similar stage of knowledge and were being exposed to the same material in lectures. The disadvantage of this approach was in the small sample size available each semester, and so the experiment was implemented a second time to see if the findings from the spring semester held up[2].

The paper is laid out as follows. The next section provides some background on the benefits of classroom discussion generally and describes in detail the interpretative question cluster technique that is the focus of the experiment. Section three describes the article used for the experiment and the three different section formats that were employed. Section four summarizes the results of the experiment, including a description of each of the sections in terms of student participation, student performance on a quiz taken at the end of each discussion and on a subsequent exam question, and student reactions to the techniques used. Section five concludes.

2. CLASSROOM DISCUSSION AND THE INTERPRETIVE QUESTION CLUSTER TECHNIQUE

Classroom discussion fundamentally involves the exchange or pooling of ideas – both amongst students and between students and the instructor. Gibson (1992, p 108) classifies teaching styles as discipline-centered, instructor-centered or student-centered, and discussion fits into the latter category. Discussion provides a way to increase student involvement, that Gibson points to as "one of three 'critical conditions of excellence'

[2] I plan to continue to build the database of outcomes by implementing the experiment in future semesters.

identified by the eminent study group" when referring to a report titled *Involvement in Learning* from the National Institute of Education. Hansen and Salemi (1998 p.209) describe classroom discussion as a form of "two-way talk" that facilitates active learning by students. They point out several advantages of discussion, including its role in the development of students' ability to form their own answers to the questions posed and to judge the merits of various arguments. Hansen and Salemi (1998 p. 209)) also acknowledge that the use of such techniques involve some trade-offs, however. Specifically, by placing the responsibility on students to come up with answers, both the quality of the information flow and the volume of material covered may be reduced.

In order to promote effective discussion, structure is crucial. The specific form of discussion structure that is at the core of this study centers on clusters of questions, where the constituent questions are of various types. This interpretive question cluster technique was developed by Hansen and Salemi (1998) for use in economics and applies the ideas of Mortimer Adler to discussion of economics materials.

Hansen and Salemi (1998) outlines several important elements to set the stage for use of this technique, including the careful selection of appropriate material (p.211) upon which the base the discussion, while Salemi (1995) stresses the importance of advance preparation and distribution of questions by the discussion facilitator (p.3). The technique is based on identifying and developing different types of questions and building question clusters around one of those question types – an interpretative question. An *interpretative question* is defined as one that asks students to explore the author's meaning and "requires the participant to use higher-order cognitive skills together with the evidence, or facts, reported in the reading to arrive at an answer" (Hansen and Salemi

(1995, p.215). The two other question types identified by this technique are *factual questions*, which asks for information provided in the assigned text and *evaluative questions*, which require the use of judgment by the participants based on their own experiences and the material in the assign text (Hansen and Salemi (1995)).

Different types of questions fulfill various question roles in the discussion, as described in Figure 14-1 of Hansen and Salemi (1995) (See Appendix A). The fact that interpretative questions are the only type that fulfills the *basic* question role, the technique suggests that discussion start with an interpretative question[3]. This interpretative question is then augmented by a set of related questions – both factual and evaluative – to guide the discussion in a structured and fruitful manner, with the question cluster usually ending with an evaluative question where participants get to make judgments about the outcome of the discussion.

An important facet of this discussion technique is that it be centered on a set of learning objectives and that the discussion facilitator guides the discussion towards those objectives. In the description of the class formats below, explicit learning objectives are specified for the interpretive question cluster technique format.

3. THE CHOICE OF READING AND THE THREE DIFFERENT CLASS FORMATS

Hansen and Salemi (1998, p 211) specifies certain criteria that readings should meet in order to be appropriate for classroom discussion. These include ensuring that the reading contains a sufficient number of ideas to warrant discussion, be self-contained and well written and be interesting to both the instructor and the students. Mankiw's article

[3] See Salemi (2005, pp.6-7) for a more thorough explanation of why starting with an interpretative question is important for a fruitful discussion.

"The Macroeconomist as Scientist and Engineer" easily meets these criteria, in the view of this instructor. The article pulls together the main developments in macroeconomics since the great depression and looks at these developments from both a theoretical and policy perspective. Therefore, it focuses on ideas that are at the absolute core of any course on intermediate macroeconomic theory. Given some background in macroeconomics that all intermediate-level students should have, the article is self contained and is certainly well written, and, given the centrality of the themes covered to a course in macroeconomics, the article should be of major interest to both the students and the instructor[4].

For each of the three session format types, there were certain common elements. In all cases, for example, the instructor knew the students individually and regularly called on them by name. In most of the sessions, students sat in a circular or semi-circular arrangement and all students were informed in advance that there would be a short quiz at the end of the session. The major differences between the sessions were that different preparation materials were distributed in advance and , for the interpretative question cluster format, learning objectives were specified. The structure of each session is described in more detail below.

- *Interpretive Question Cluster Discussion Format*

Preparation for the interpretive question cluster (IQC) discussion format involved specifying learning objectives for the session and developing a set of three question clusters based on the reading. Students were also provided with a contract for effective

[4] For the reader that is not familiar with this Mankiw article, a summary of the article in the form of power point slides in included as part of Appendix B.

discussion in advance (See Appendix B). Following the method of Hansen and Salemi (1998), each question cluster began with an interpretative basic question that was supported by factual and evaluative questions. Each cluster ended with an evaluative question, where students were asked to form a judgment based on evidence from the reading. As the discussion progressed, the instructor supplemented these pre-circulated questions with follow-up questions.

The major difference between the IQC and the UD format described below is that for the IQC format, the role of the instructor was one of facilitator rather than leader. The instructor did not provide answers to the questions but instead tried to guide students to finding those answers for themselves. Direct questions of the instructor were not answered by the instructor but were referred back to the students and the instructor made more frequent references to previous contributions by students.

- *Unstructured Discussion Format*

Preparation for the unstructured discussion (UD) section comprised the circulation of three very general questions about the reading that were developed without taking account of question type or role (See appendix B). In the Spring 2008 semester, the session started with a several minute introduction by the instructor where some motivation for why the reading was interesting and relevant for the course was provided. Examples from previous lectures were drawn upon to illustrate how our thinking about macroeconomics has evolved and where controversy still remains. After the introduction, the instructor opened the floor to participation by students by asking the first of the pre-distributed questions "What is a macroeconomic scientist/a macroeconomic engineer?" A couple of students responded with answers based on the reading and more

interventions followed prompted by follow-up questions. These questions tended to be factual in nature, prompting relatively short and "dead-end" responses. The instructor wrote a very brief summary of the student responses on the board before moving the second question.

The second question asked "What were the major developments in macroeconomics discussed in the article?" which covered a huge amount of the material in the article. To help structure the information, follow-up questions were asked starting with the Keynesian revolution and working chronologically through the new developments up to the latest new-Keynesian ideas. A timeline of the developments was written up on the board as the information was discussed. Student interventions were frequent but, again, were usually short and were of a factual nature. This part also prompted a few questions from the students directed towards the instructor. Some follow-up questions were aimed at connecting the material discussed under this question to the first question distinguishing between macroeconomists' role as scientists and engineers. The third and final question distributed asked "What are the main elements of the new neo-classical synthesis?" Again, with the help of prompting questions, students identified that the main elements came from both the new Keynesian and the new classical schools. The instructor provided many of the details and summarized them on the blackboard.

Overall, this section was somewhat of a hybrid between discussion and lecture. In contrast to the pure lecture format, the students rather than the instructor provided much of the information from the reading, with frequent but short interventions by a wide range of students throughout the class. In contrast to the Hansen-Salemi style discussion

based on interpretive question clusters, the instructor was very much the leader of the section, answering questions and organizing, summarizing and supplementing the material provided by students. Student involvement, while frequent, was limited largely to providing material from the text rather than interpreting it, although some degree of evaluation did take place when students' linked their answers to the second and third questions back to the first question, discussing whether various developments in macroeconomics were primarily a scientific or an engineering success in their view.

- *Lecture Format*

During the lecture sessions, the instructor dominated, presenting the material from the reading using a power-point presentation. At the beginning of the session, students were encouraged to intervene with questions or comments at any time during the presentation. A handout of the power-point slides was distributed at the beginning of the session but no questions or materials other than basic instructions were distributed in advance. (See appendix B) As expected, these sessions (both in the Spring and Fall semesters) were far less interactive than either of the other two formats. In fact, the atmosphere was quite dead, with very few contributions from students. Most of the student interventions comprised short answers to factual questions posed by the instructor with a very small number of questions being asked of the instructor.

4. THE OUTCOMES FOR THE THREE DIFFERENT CLASS FORMATS

Students in the intermediate macroeconomic theory course were accustomed to having 50-minute discussion sections each week, where articles from policy institution publications, magazines such as the Economist and newspapers are discussed using the

unstructured discussion format described above. To assess the different session formats used, I will first compare what happened during each of the three classes. I will then provide some information about student reaction to the session formats, where they compare the lecture format and the interpretative question cluster format to the unstructured discussion format to which they were accustomed. Student learning from each of the sessions is the examined based on their performance on a quiz administered at the end of each section and a subsequent final exam question.

- *Student Participation During the Sessions*

Table 1 documents the extent and nature of student participation for each of the session formats for the spring and fall semesters, 2008. Clearly, the format of the session influenced the behavior of both the students and the instructor. Unsurprisingly, the lecture format results in the lowest level of student participation and by a huge margin: there were only twelve interventions by students over the two semesters for this format. This reflected both the behavior of the instructor, who asked far fewer questions of the students compared with the other formats, and the more passive behavior on the part of the students.

Table 1: Student Participation During Discussion Sections

	Interpretative Question Cluster	Unstructured Discussion	Lecture
SPRING 2008			
Number of Student Interventions	**77**	**43**	**8**
Comprising			
Student responses to instructor questions	61	37	6
Student to student interaction	13	1	0
Student questions to instructor	3	5	2
FALL 2008			
Number of Student Interventions	**75**	**40**	**4**
Comprising			
Student responses to instructor questions	65	37	3
Student to student interaction	7	0	0
Student questions to instructor	3	3	1
TOTALS OVER BOTH SEMESTERS			
Number of Student Interventions	**152**	**83**	**12**
Comprising			
Student responses to instructor questions	126	74	9
Student to student interaction	20	1	0
Student questions to instructor	6	8	3

The more interesting comparison is between the two discussion formats – the unstructured discussions (UD) versus the interpretive question cluster (IQC) discussions. In both semesters, students intervened almost twice as frequently in the IQC sessions versus the UD sessions[5]. The nature of the interventions was also different, with a greater degree of student-to-student interaction in the IQC sessions. An intervention is classified as student-to-student when a student intervention is followed immediately by a contribution by another student without the intervention of the instructor, either building on the answer of the first student or reacting directly to what that student said. On a few

[5] The seemingly large number of interventions for a 50-minute period reflects the way interventions were counted: even the shortest contribution by a student – sometimes consisting of a single phrase or sentence was counted.

occasions during the IQC sessions, there was a string of several student interventions, something that didn't happen during the sessions using other formats.

The instructor behavior also differed across the IQC and UD sessions. In the UD sessions, the instructor acted as a leader, providing a summary of what the discussion would be about and motivation for why the topic was important at the beginning of the session, answering student questions directly and drawing together issues on the board. The instructor was in "sheep-dog" mode for much of these sessions, shepherding the students towards the main issues in the reading and working to ensure the quality of the information stream was accurate[6]. A greater portion of the questions asked by the instructor was factual in nature compared with the IQC sessions and the instructor provided information when students' failed to identify a salient point. When students asked questions directly of the instructor, the instructor provided an answer.

In contrast, during the IQC sessions, the instructor played the role of facilitator rather than leader. At the beginning of these sessions, the instructor made it clear to students that they were responsible for coming up with answers or identifying different view points on a certain topic: the instructor was not going to provide answers but would simply direct the discussion or act a "traffic cop" rather than a "sheep dog". When students did ask questions directly of the instructor, the instructor either referred to a point made earlier by another student helping the questioner answer her own question, or asked other students to weigh in on the issue. On several occasions in the both the IQC sessions (seven and five times in the spring and fall sessions, respectively), the instructor referenced points made by students earlier in the discussion. In both these sessions,

[6] The terms "sheep dog" and "traffic cop" used below to describe instructor behavior are attributed to Michael Salemi.

student interventions accounted for a far greater percentage of the "air time" compared with the other two formats and there was participation across a wider range of students. By clarifying in advance the instructor's expectations of the students and through alterations in her own behavior, the evidence points to greater responsibility being taken by the students for the outcome of the discussion under the IQC format.

- *Students' Reactions to the Discussion Formats*

A day after the discussion sessions, the instructor distributed a feedback form to the students that asked them to compare the new session formats to the unstructured discussion structure we used throughout the semester. Completion of the form was voluntary and students had the option to keep their responses anonymous. Table 2 contains the questions asked on the brief survey and summarizes student responses.

The first question revealed that 20 of 27 respondents exposed to the IQC format either preferred it or liked it equally compared with the usual UD format while only 12 of 27 respondents who received the lecture treatment felt that way. All respondents but three reported that they spent as long or longer than normal preparing for the Mankiw discussion and only students expecting the lecture format responded that they spent less time preparing. That most responses indicated a longer preparation time was at least in part attributable to the longer than usual reading that was assigned for these sessions and the prospect of a quiz, a subsequent question asked specifically whether the preparation time was influenced by the expected discussion session format. The responses were almost equally split although it became evident from written additional comments that students were factoring in the length of the reading as well as the discussion format when answering the question.

Table 2: Student Responses to the Different Discussion Session Formats

	Spring 2008		Fall 2008	
	Lecture	Interpretive Question Cluster	Lecture	Interpretive Question Cluster
Total Number of Responses	**8**	**12**	**19**	**15**
1. Compared with the usual discussion format, what did you think of the format you experienced for the Mankiw discussion?				
I **much preferred** the Mankiw discussion format	1	2	0	2
I **preferred** the Mankiw discussion format – **but not by a big margin**	1	4	4	2
I **liked** the usual format and the Mankiw discussion format **equally**	1	4	5	6
I liked the Mankiw discussion format **less** – **but not by a big margin**	2	2	6	3
I like the Mankiw discussion format a **lot less**	3	0	4	2
2. How did the amount of time you spent preparing for the Mankiw discussion compare with your usual preparation time for discussion?				
I spent a **lot longer** preparing for the Mankiw discussion	1	5	4	10
I spent a **bit long**er preparing for the Mankiw	6	7	10	2
I spent about **the same** amount of time preparing for the Mankiw discussion	1	0	2	3
I spent a **bit less time** preparing for the Mankiw discussion	0	0	3	0
I spent a **lot less time** preparing for the Mankiw discussion	0	0	0	0
3 Did the anticipated format of the Mankiw discussion (rather than the length of the reading) influence your decision about the amount of time you spent preparing?				
Yes, I spent a longer time preparing because of the discussion session format	2	8	9	9
Yes, I spent a shorter time preparing because of the discussion session format	0	0	1	0
No, the format of the discussion session did not influence my preparation time.	6	4	9	6

The students were invited also to share any general comments about their discussion experience with the alternative formats. In response to the lecture format instead of the usual unstructured discussion, student said:

> "I find regular discussions more helpful because I am learning more actively"
>
> "In lectures, I need to go over my notes to understand the material. During our usual discussions, talking about the material helps me understand/remember more."
>
> "The lecture format was okay, but I prefer the discussion format because it is easier to absorb new information"
>
> "I prefer classes that are more discussion-based because the interaction in class helps me to learn more effectively. Being involved in the discussion usually allows me to master the material better."

> "Just to clarify, I think the reason I did nor like the Mankiw discussion as much as our normal discussions was because we covered so much material and there was a lot less time for participation. It was also less interactive."
>
> "I feel like the power point teaching method is inhibiting. I don't think you need it, especially not during a discussion, although it also wouldn't be good for our lectures. I think the way we usually did discussions worked well."

These responses are consistent with the education literature that states discussion promotes more active learning. It also indicates clearly that students value the opportunity to participate in class and are less likely to participate when the format of the class is not structured deliberately to encourage that participation.

In response to the IQC format instead of the usual unstructured discussion, students volunteered the following comments:

> "I really liked this new kind of discussion set up. I felt like the prompting questions effectively engaged students and gave us more opportunity to speak. Also, having question clusters enabled me to read with more direction. I felt like I had a better idea of what we would be discussing and was more prepared to answer questions in class. I would also like to note that my response to number 3 is attributed to the fact that the article was much longer than other articles and we had more questions to consider. Because there were more questions, I feel like I did more preparation outside of class and was better prepared for the discussion."
>
> "Although open discussion isn't usually my favorite format, I found today's discussion useful. Advantages of this format: 1. Clear structure lets students know what to expect and how to prepare. 2. Student learning was more collaborative. Disadvantages of this format 1. Preparation level would probably fall off quickly as the semester went on 2) A lot of regurgitation of the text took place"
>
> "I really liked the student-led discussion style with you just as facilitator. I think it was great that we sat in a circle and I wished we would have done a similar activity for the other discussions. Perhaps you should use a seminar room with one big table for the discussion groups next year?"
>
> "The fear of a quiz did induce me to study a little more. Also, though, I did prefer the discussion-style session and you did an extraordinary job facilitating in one or two situations, it would have been nice if you said - here is the answer. Example, I said one thing (I forget what) someone else said the opposite, we evaluated each side (good so far) but after doing so there was no conclusion. An eventual conclusion would be nice."

Again, these comments show that student are motivated by opportunities to participate actively in class and to take more responsibility for their own learning. The comments also point to the importance of the preparation materials and the expectations set for students before the discussion. It is interesting to note, however, the observation made in the final student comment above about the lack of an instructor-provided conclusion. While students welcome the additional responsibility this format gives them, there is still a tendency to look to the instructor to tie everything up neatly for the students. Perhaps repeated exposure to the IQC technique would change that.

- *Student Performance in Assessment Exercises*

Two assessment exercises were conducted to evaluate students' learning outcomes for the Mankiw discussions. The first took the form of a short quiz at the end of each of the three discussion sessions where the questions were very direct and closed. When conducting the quiz, students were assigned a number so that they would not be identified as belonging to a particular discussion section during the grading process. The second was an essay-style question on the final exam at the end of the semester where students had the option to use as much or as little as they wished of the material from the Mankiw discussion in answering an open-ended question about the appropriate role of stabilization policy. This topic was also covered in the lecture segment of the course and in the course textbook, with the discussion material intended to enhance student understanding of this topic. In both cases, the assessment exercises were designed to evaluate the extent to which the learning objectives for the discussion session were met.

Tables 3 and 4 summarize students' performance on these assessment exercises from the spring and fall semesters, 2008. Given that we cannot assume that student

quality was uniform across the three different discussion sections, their performance on the assessment exercises was evaluated relative to their overall performance on the course.

Table 3: Student Performance on Assessment Quiz

Section	Average Course Score	Average Quiz Score	Median Course Score	Median Quiz Score
Spring 08				
IQC	81.54	72.41	89.17	72.22
L	74.17	63.51	78.75	63.89
UD	79.94	59.38	84.17	61.11
Total	79.34	66.26	84.17	65.72
Versus total				
IQC	1.03	1.09	1.06	1.10
L	0.93	0.96	0.94	0.97
UD	1.01	0.90	1.00	0.93

Section	Average Course Score	Average Quiz Score	Median Course Score	Median Quiz Score
Fall 08				
IQC	83.91	51.63	88.10	50.00
L	75.37	50.77	79.75	44.44
UD	81.28	66.95	82.43	69.42
Total	79.69	54.94	82.43	50.89
Versus total				
IQC	1.05	0.94	1.07	0.98
L	0.95	0.92	0.97	0.87
UD	1.02	1.22	1.00	1.36

Looking first at average quiz scores for the spring semester (second column), we can see that students in the IQC section performed relatively better than those in the other sections. When looking at these outcomes relative to how these students did in the course as a whole, we see that while the IQC group was the strongest in the course, the margin by which they outperformed the other groups was larger on the discussion quiz. This result holds when we look at median rather than average performance. Interestingly, the lecture group appears to have benefited from the format of their section, under performing the class as a whole by a lesser margin on the quiz than in the course. The

results for the fall semester tell a different story, indicating that the group getting the unstructured discussion format benefited relative to the other groups. Of course, all these numbers should be interpreted with caution given the very small sample size and the uneven distribution of students across groups[7]. It is interesting to note that it was the students from the smallest non-lecture group in both cases that should the largest performance improvement.

Table 4: Student Performance on Exam Question Related to the Discussion

Section	Average Final Score	Average Q3 Score	Median Final Score	Median Q3 Score
Spring 08				
IQC	81.54	82.29	89.17	83.33
L	74.17	66.67	78.75	79.17
UD	79.94	79.81	84.17	83.33
Total	79.34	77.91	84.17	83.33
Versus total				
IQC	1.03	1.06	1.06	1.00
L	0.93	0.86	0.94	0.95
UD	1.01	1.02	1.00	1.00

Section	Average Final Score	Average Q3 Score	Median Final Score	Median Q3 Score
Fall 08				
IQC	81.08	73.04	83.33	88.33
L	69.92	67.26	75.00	75.00
UD	76.74	72.57	75.42	70.83
Total	75.35	70.50	79.17	75.00
Versus total				
IQC	1.08	1.04	1.05	1.18
L	0.93	0.95	0.95	1.00
UD	1.02	1.03	0.95	0.94

Conducting the same analysis for the exam question relating to the discussion material, we see that again, the average performance for the IQC was higher than for other groups in the spring semester and the margin by which they out-performed their classmates was greater on the discussion related question. This result does not hold up,

[7] N=42 for the spring semester, with 13, 10 and 19 in the IQC, L and UD groups, respectively. The comparable numbers for Fall 2008 are N=50, with 17, 21 and 12 in the IQC, L and UD groups, respectively.

however, if we look at median rather than average scores. The opposite is true for the fall data, where the median scores are relatively higher on the discussion-related question for the IQC group but not the average scores. Again, this points to the need for more data to make reliable assessments of these outcomes and possibly finer measures of learning outcomes.

5. CONCLUSION

This study implemented three different formats for sub-groups of students from an intermediate macroeconomic theory course to investigate whether the format of discussion sessions impacts student participation and student learning outcomes. In terms of student participation, the evidence clearly suggests that the format of the discussion matters. The materials distributed in advance for preparation and the format the class takes has clear implications for student behavior.

Students participated more actively when expectations were made explicit about their role and responsibilities. The nature of students' participation was also influenced by the format of the discussion. When the role of the instructor was clearly defined as that of facilitator, students were more inclined to respond directly to each other's contributions. They intervened more often in class when the IQC format was utilized although the level of intervention for the UD format was also significantly higher than during the lecture format. The instructor's behavior was also influenced significantly by the planned structure of the session.

Students responded positively to the more interactive session formats and perceived that they learned more when they were more active participants in the process. Whether students' learning outcomes were influenced positively by their participation in

the IQC session and whether any gains over the lecture format are comparable for the UD session participants is unclear given the limited data available. It is intended to expand this database over time by implementing the experiment several more times and, in this way, shed some more light on the learning outcome question.

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Appendix A: The Interpretive Question Cluster Technique

Figure 14-1: A Two-Way Classification of Discussion Questions

Question Roles	Question Types: Interpretive	Factual	Evaluative
Basic	Yes	No	No
Supporting	Yes	Yes	No
Follow Up	Yes	Yes	No
Concluding	Possibly	No	Yes

Source: Hansen and Salemi (1998)

Definitions (also from Hansen and Salemi (1998))

Interpretive: asks discussion participants for an interpretation; it asks them to explore what the author meant by what s(he) said.

Factual: asks for specific information that can be found in the reading assigned for discussion

Evaluative: asks participants for a judgment. It invites them to consider the material in terms of their own experience and to determine whether they agree or disagree with the author's point of view.

Basic: Used to begin a discussion. Should concern a very important issue in the reading and should stimulate participant responses.

Supporting: Used by the leader to organize discussion of the basic question. May break the basic question into smaller parts. May ask what the author means by a concept relevant for the basic question.

Follow-up: Probes the response that a student has made to an earlier question. Prompts participants to make additional contributions. Used to direct "traffic" during a discussion, to make connections between responses offered by participants.

Concluding: Used by the leader to draw a line of discussion to a close. May ask participants to provide a summary answer to the basic question, to assess whether the issues are sufficiently resolved f to make judgments about the arguments that have been raised.

Appendix B: Preparation Materials for the Three Discussion Session Formats

Instructions for Interpretive Question Cluster Discussion Group

Dear Students,
We will conduct our session on the Mankiw article using a **discussion technique based on the question clusters below. (Remember, you must come to your assigned session based on the list posted on Moodle under Discussion 11).** I will act as discussion facilitator rather than a discussion participant or leader. I will direct the discussion but will not provide answers. It is up to you – between you – to arrive at answers.

For this exercise:
1. Please remember to record the amount of time you spent preparing for the session, including the time spent reading the assigned article.
2. There will be a short quiz at the end of the session.
3. Please do not discuss or share the format of the session, the questions below or the content of the quiz with others in the class from different discussion groups.

Contract for Effective Discussion

Discussion Facilitator	Discussion Participants
Preparation for Discussion	*Preparation for Discussion*
Read material carefully	Read material carefully
Prepare question clusters in advance	Prepare to answer the questions provided and to answer follow-up questions
Pose questions carefully	Don't base answers on outside material unless all the class have read it
During Discussion	*During Discussion*
Develop discussion in depth	Listen carefully
Strive for answers	Ask for clarification of points not understood
Avoid difficult or technical terms	Answer the questions the facilitator poses before adding more points
Listen intently	Stick to the subject
Involve each participant	Respectfully challenge answers with which you disagree
Confine yourself to asking questions	Be willing to change your mind if others show error

Reading

Mankiw, N, Gregory, "The Macroeconomist as Scientist and Engineer", *Journal of Economic Perspectives*, 20 (4), Fall 2006, 29-46"

Question Clusters *(Note: I, F, E refer to whether the question is interpretive, factual or evaluative)*

1) According to Mankiw, what potential contributions can macroeconomists make? (I)
   a) How does Mankiw distinguish between a macroeconomist fulfilling the role of scientist versus that of engineer? (F)
   b) According to the author, what contributions were made by "Keynesian Revolution" economists to clarify and elaborate on Keynes' *General Theory*? (F or I)
   c) According to Mankiw, was the Keynesian revolution a scientific/engineering success? (F)
   d) Do you think the distinction between "scientist" and engineer" is an appropriate one for macroeconomists? Why? (E)
   e) Can you think of an example of a macroeconomic engineer in today's economy? Explain why you think they fit the bill? (E)

2) Why, according to the author, did the Keynesian consensus breakdown after a couple of decades? (I)
   a) What were the main elements of the three waves of New Classical economics? (F)
   b) What were the key elements of the three waves of New-Keynesian research? (F)
   c) What was the main goal of the New Classical economists? Do you think they achieved that goal? Why? (E)
   d) Do you think the New Keynesian developments were successful i) as a matter of science ii) as a matter of engineering? Support your answer with evidence from the reading. (E)

3) According to Mankiw, how have elements of both the New Classical and the New Keynesian research paths contributed to the new neo-classical consensus that emerged in the 1990s? (I)
   a) What are the main elements of the new neoclassical synthesis and which school of thought (early Keynesian, New Keynesian, New Classical) do they most reflect? (F)
   b) What evidence does the author present on how theoretical developments since the 1970s have/have not altered how monetary and fiscal policy is conducted in practice? (F)
   c) How would you grade the development of macroeconomics since the 1970s? Justify your grade using material from the reading. (E)

Learning Objectives

By reading and discussing Mankiw's article "The Macroeconomist as Scientist and Engineer", students should be able to

- Distinguish between macroeconomist roles of "scientist" and "engineer"
- Describe the Keynesian revolution arising out of the Great Depression
- Construct a flow chart of the major developments in New Classical Economics and in New-Keynesian Economics
- Describe the new synthesis that emerged in the 1990's
- Identify some successes and failures of the theoretical developments described in the article for both macroeconomic science and macroeconomic engineering

Instructions for Unstructured Discussion Group

Dear Students,
We will conduct the discussion on the Mankiw article using the same discussion format as we have been using all semester. **(Remember, you must come to your assigned session based on the list posted on Moodle under Discussion 11)**

The only differences are:
1. Please remember to record the amount of time you spent preparing for the discussion, including the time spent reading the assigned article.
2. There will be a short quiz at the end of the discussion session.
3. Please do not discuss the format of the session, the questions below or the content of the quiz with others in the class from different discussion groups.

Reading

Mankiw, N, Gregory, "The Macroeconomist as Scientist and Engineer", *Journal of Economic Perspectives*, 20 (4), Fall 2006, 29-46"

Please come to class prepared to discuss the following questions:

1. What is a macroeconomic scientist/a macroeconomic engineer?
2. What were the major developments in macroeconomics discussed in the article?
3. What are the main elements of the new neo-classical synthesis?

Instructions for Lecture Group

Dear Students,
We will conduct our session on the Mankiw article using a **lecture** format. As always, you are welcome to participate by asking questions during the lecture. (Questions will count as participation for your participation points.) **(Remember, you must come to your assigned session based on the list posted on Moodle under Discussion 11)**

For this exercise :
1. Please remember to record the amount of time you spent preparing for the session, including the time spent reading the assigned article.
2. There will be a short quiz at the end of the session.
3. Please do not discuss the format of the session or the content of the quiz with others in the class from different discussion groups.

Reading

Mankiw, N, Gregory, "The Macroeconomist as Scientist and Engineer", *Journal of Economic Perspectives*, 20 (4), Fall 2006, 29-46"

Power point Slides Distributed to Students at the Beginning of the Lecture Session

Discussion 11

The Macroeconomist as Scientist and Engineer

N. Gregory Mankiw
Journal of Economic Perspectives 20(4) Fall 2006 pp. 29-46

1

Potential Contributions of Macroeconomists

- Scientist:
  - Propose and test elegant theories formulated with mathematical precision
  - Use large data sets and sophisticated empirical techniques to reach unbiased empirical judgments
  - Understand how the world works, develop analytical tools, establish theoretical principles

2

Potential Contributions of Macroeconomists

- Engineer
  - Solve practical problems (big problems!)
  - Use macroeconomists in policy making – e.g. monetary and fiscal policy

3

Keynesian Revolution

- Macroeconomists as a distinct field arose out of the Great Depression
- Keynes' General Theory (1936) was a focal point for trying to understand the Depression
- Augmented/simplified by Hicks (1937) and Modigliani (1944) with IS/LM model
- Applied models for policy analysis developed by econometricians such as Klein – including precursor to FRB/US model used by Fed today

4

Keynesian Revolution

- Key elements of these models with a Keynesian structure were
  - IS curve relating financial conditions and fiscal policy to GDP
  - LM curve determining interest rates as the price that equilibrates supply and demand for money
  - Phillips curve describing how the price level responds over time to changes in the economy
- Both scientific advances and involvement in policy-making – e.g. Kennedy tax cut 1964

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New Classical Economics

- Monetarism
  - Friedman (1957) :Permanent Income Hypothesis (attack on Keynesian Consumption function and fiscal multipliers)
  - Friedman and Schwartz (1963): Monetary History of the US – inept monetary policy source of economic instability
  - Friedman and Phelps (1968); Phillips curve trade-off between inflation and unemployment would not hold in the long run

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New Classical Economics

- Rational Expectations
  - Lucas (1976): Lucas Critique – Mainstream Keynesian models were useless for policy analysis because the failed to take expectations seriously – so empirical relationships would break down if new policy were implemented
  - Lucas (1973): imperfect information – monetary policy only matters if it surprises people and confuses them about relative prices
  - Sargent and Wallace (1975): Impossible to surprise rational people systematically

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New Classical Economics

- Real Business Cycle (RBC) Theories
  - Kydland and Prescott (1982): instant price adjustment to clear markets, omitted any role for monetary policy, role of random tech shocks and intertemporal substitution as a response

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New Classical Economics

- Impact on macroeconomics
  - Field became more rigorous and tied to micro tools
  - Goal was to undermine old Keynesian macroeconomics both as a matter of science and as a matter of engineering
  - New Classical school did not have a model "ready to bring to Washington"

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New Keynesian Economics

- Effort to provide microfoundations for macroeconomic models
- Early Keynesians – neoclassical-Keynesian synthesis – classical in the long run, imperfection such as pre-determined prices in the short run
- New Keynesians built on (rather than rejecting) this synthesis

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New Keynesian Economics

- General Disequilibrium Theories
  - Barro and Grossman (1971): General equilibrium analysis when markets do not clear. How failure of one market to clear affects S&D in related markets. Prices and wages taken as given

11

New Keynesian Economics

- Rational Expectations in Models without the Assumption of Market Clearing
  - Fisher (1977): Role for systematic monetary policy even with rational expectations
  - Taylor (1980): Find a realistic model of inflation dynamics

  (Problem with unrealistic form of labor contracts)

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New Keynesian Economics

- Why wages and prices fail to clear markets
  - Menu costs, efficiency wages
  - Mankiw (1985), Akerlof and Yellen (1985): when firms have market power, there are large differences between private and social cost-benefit calculations regarding price adjustment (sticky price equilibrium can be privately rational and socially costly)

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New Keynesian Economics

- Succeeded as a science by developing a coherent microeconomic theory for the failure of the invisible hand for short run macroeconomic phenomena
- New Keynesian economists more involved with policy making although questionable as to the contribution of the new theories
  - Krugman (2000) "One can explain how price stickiness could happen. But useful predictions about when it happens and when it does not, or models that build from menu costs to a realistic Phillips curve just don't seem to be forthcoming"
- Tensions prevailed between new classical and new Keynesian economists

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New Neoclassical Synthesis

- Merges elements of preceding competing approaches (1997-)
  - New Classical: tools of dynamic stochastic general equilibrium theory
  - New Keynesian: Use of nominal rigidities to explain why monetary policy works in the short run (new Keynesian Phillips Curve)
  - The essence is similar to IS/LM
  - Use the analytical tools developed by the new classicals but used in models with sticky prices
- Economy is a dynamic general equilibrium system that deviates from a Pareto optimum because of sticky prices (and perhaps other market imperfections)

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New Neoclassical Synthesis

- Have the advances in macro science altered how professional economists analyze policy?
  - Monetary Policy
    - Meyer – seems based in the neoclassical-Keynesian synthesis of the 1970's
    - Institutional changes in central banking only loosely related to theoretical literature on rules/discretion
    - These institutional changes not necessarily linked to the improvements seen in monetary policy making
  - Fiscal Policy
    - Bush tax cuts 2003– more money (income), more spending, more employment – Keynesian logic
    - Model used by Council of Economic Advisers direct descendent of Klein, Modigliani etc. with minimal influence of the new Keynesians and new classicals

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New Neoclassical Synthesis

- Mankiw argues that the fact that modern macroeconomic research is not widely used in practical policymaking is *prima facie* evidence that it is of little use for this purpose
- The research may have been successful as a matter of science but it has not contributed significantly to macroeconomic engineering

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New Neoclassical Synthesis

- Undergraduate students usually have the perspective of "engineer" more than "scientist"
- Intermediate macro textbooks – some version of the neoclassical – Keynesian synthesis with greater emphasis than before on classical economic theory, long-run growth and the role of expectations

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Appendix C: Assessment Materials
Mankiw – The Macroeconomist as Scientist and Engineer– Feedback

Please answer the questions below and either **email the completed form to me** rosulliv@email.smith.edu as an attachment or (to preserve your anonymity) **print it out and hand it in** during class on Monday or Wednesday (Dec 1 or 3).
If you participated in the Wed afternoon discussion, you may skip questions 2 and 4.

Name (Optional) _____

1. Which discussion section (for the Mankiw article) did you participate in? (Check or place X beside the relevant one)

____Wed morning ____Wed afternoon ____Friday morning

2. Compared with the usual discussion format, what did you think of the format you experienced for the Mankiw discussion?

____ I **much preferred** the Mankiw discussion format

____ I **preferred** the Mankiw discussion format – **but not by a big margin**

____ I **liked** the usual format and the Mankiw discussion format **equally**

____ I liked the Mankiw discussion format **less** – **but not by a big margin**

____ I like the Mankiw discussion format a **lot less**

3. How did the amount of time you spent preparing for the Mankiw discussion compare with your usual preparation time for discussion?

____ I spent a **lot longer** preparing for the Mankiw discussion

____ I spent a **bit long**er preparing for the Mankiw

____ I spent about **the same** amount of time preparing for the Mankiw discussion

____ I spent a **bit less time** preparing for the Mankiw discussion

____ I spent a **lot less time** preparing for the Mankiw discussion

4. Did the anticipated format of the Mankiw discussion (rather than the length of the reading) influence your decision about the amount of time you spent preparing?

____ Yes, I spent a longer time preparing because of the discussion session format

____ Yes, I spent a shorter time preparing because of the discussion session format

____ No, the format of the discussion session did not influence my preparation time.

5. Please feel free to share any additional comments you may have.

Eco 253 – Fall 2008: Discussion 11
Mankiw: The Macroeconomist as Scientist or Engineer Assessment Exercise

Number _____

Amount of time spent preparing for the discussion _____

1) The role of a macroeconomic scientist is to

   _____

2) The role of a macroeconomic engineer is to

   _____

3) The three key elements of the macro models that emerged in response to Keynes' General Theory were:

   _____

   _____

   _____

4) The three main developments of New Classical Economics (in order) are

   _____

   _____

   _____

5) The three main developments of New Keynesian Economics (in order) are

   _____

   _____

   _____

6) A key element from New Classical research in the New Synthesis is:

_____

7) A key element from New Keynesian research in the New Synthesis is:

_____

Give one example of how the theoretical developments described in this article have helped:
the science of macroeconomics _____
the engineering of macroeconomics_____

Question relating to the Discussion Reading from the Final Exam

Stabilization Policy

You are the chief economic adviser to the policymakers (Government and/or Central Bank) of a large closed economy. Economists agree that the **natural rate of unemployment is around 4.5 per cent for this economy** and that the Central Bank has an implicit **target of about 2 per cent for inflation.** Economic data show that the economy has weakened in recent times, with the **unemployment rate around 5%** and rising. Meanwhile, the **annual headline inflation rate is running at about 4 per cent**.

Write a **memo** outlining your recommendations to the policymakers on how they should deal with this economic situation.

Your memo should consist of two parts:

- The first part should outline the **key elements of the theoretical stance** you are taking in making your recommendation (i.e. – are your recommendations based on Keynesian/New Keynesian foundations or are you, perhaps, a follower of Milton Friedman or are taking a more New-Classical perspective? How does that link to your view on the role (if any) for stabilization policy, how expectations are formed, the causes of economic instability in the short run etc.)
- The second part should outline **any policy measures you would (or would not) recommend**. (Note: you should **explain why** you choose one type of policy over another (or choose to recommend no action be taken) and note any trade-offs the policymakers may be facing. While the focus should be on the short run management of the economy, you may wish to refer to any long-run implications of your policy recommendations where appropriate.)

(There is no single correct answer here. This is your chance to show the extent of your economic knowledge. Any theoretically sound, consistent approach will receive credit. You should draw on your knowledge of the various economic models used throughout the course to formulate your recommendations but you should not include graphs in your answer. (Note – this is a 6-point question – so allocate your time accordingly – making sure to address both parts of the memo.)