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THE EFFECTIVENESS OF COLLABORATIVE LEARNING TUTORIALS: THE VIEWS OF INTRODUCTORY MICROECONOMICS STUDENTS

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ABSTRACT

The paper analyses student perceptions of a collaborative learning method used in first-year microeconomics tutorials at Flinders University, Adelaide, Australia. Questionnaire responses indicate that a clear majority of students saw social, learning and skill development advantages in the collaborative approach, as against the traditional tutor-led tutorials they had experienced.

Keywords: collaborative learning, active learning, small group learning, economics education, economics tutorials

JEL Classification: .....

1. INTRODUCTION

Many teachers discover that it is only after they have taught their subject that they fully understand it. The process of organizing ideas and communicating them to others promotes their own understanding. At Flinders University, Adelaide, Australia, we have moved towards collaborative learning practice in our first year microeconomics tutorials. One of the ideas behind these tutorials is to encourage students to teach each other, to unravel problems themselves, and to explain the issues to their peers. This process results in a deeper understanding than can be had from a teacher simply stating the solution to the problem. There are other advantages of this tutorial method too. Students develop communication and interpersonal skills, and the collaborative learning tutorial is a more intense and meaningful experience for students – one that enhances participation and interest in their studies. During the tutorial, students actively interact with each other and the tutor, in contrast to their more passive role in lectures and

collaborative learning component to the tutorials. The tutorials were increased in length to two hours. Although this had resource implications, these were largely offset by having about twice as many students in each tutorial (20-24 students). The key feature of the tutorial was that the students themselves, working in small groups of five or six, attempted to answer the questions and to work through the exercises. They were supported by the tutor, but essentially worked out the answer themselves and taught each other. Tutors who taught the topic[1] in 2004 received instruction in the tutorial method, and most already had previous experience of teaching the tutorials. The method was explained to students in the first tutorial.

The typical tutorial proceeded as follows. Prior to the tutorial, students were asked to attempt exercise questions that directly related to the lecture material. A couple of sample tutorial questions are included in Appendix 1. (Our impression was that most students did attempt the exercises before the tutorial.) In the first hour of the tutorial, students discussed the answers to those questions in their groups. During this time, the tutor moved between groups listening to the discussions, acting to promote discussion and clarify points. Tutors facilitated discussion, but did not lead it or take it over. The groups constructed their own answers to the questions.

In the second hour, after a break, the group answers were discussed by the whole tutorial body and the tutor. This was usually done by a student in each group presenting the group answers, followed by the other tutorial members commenting on the answers. The tutor also added his or her comments. In six of the 12 tutorials, during the last 15 minutes, students individually answered a written test based on the tutorial content; no test was conducted in the other six tutorials. The tests were designed to indicate the importance placed on tutorial attendance. A sample test question is included in Appendix 1. The test marks made up twenty percent of the topic assessment.

3. OUR PERCEPTIONS OF THE BENEFITS

We saw a number of advantages in the collaborative tutorial format - social benefits, learning benefits, and development of skills for future careers. The tutorial method aimed to reduce the social anxiety of first year students - who may not have known anyone in the tutorial, or even the university - by providing an instant group of peers with whom they would not feel exposed, but would instead feel a sense of community through

[1] Topic is the official terminology at Flinders University for what is commonly referred to as a "subject" elsewhere.

engaging in the common task of grappling with and understanding the topic material. Secondly, we hoped that the method would help to promote deeper understanding. Answers were questioned by other students and the tutor, who asked for further clarification. Misunderstandings, extensions and extreme cases were considered. Students were exposed to different styles of thinking, and different ways of tackling the problems. Having already thought about the problems, the arguments and comments of the tutor were more meaningful to the students. Thirdly, we thought that interacting in small groups would give students practice in communication and interpersonal skills useful in their later careers. Workers often operate in formal or informal small groups, asking questions and advice of peers, sometimes accepting and at other times rejecting ideas, and then forming their own opinion by synthesising the contributions of others with their own previous experience and knowledge. We thought that the tutorial format would provide valuable practice in these skills.

The key issue, of course, is not our perception of the advantages, but those of the customers - the students. To this end, we surveyed student opinion.

4. THE QUESTIONNAIRE

After they had received their results, all students enrolled in the topic in 2004 were emailed a request to answer a questionnaire. As an incentive, students who completed the questionnaire qualified for a random draw to win one of three prizes (one of $100, and two of $50). Although students gave their identification number, they were assured that this information would only be used by an external party; it would not be accessible to teaching staff. Students who did not complete the survey were emailed a second request to answer the questionnaire, and paper copies of the questionnaire were made available in tutorials.

5. THE RESULTS

Eight students who enrolled in the topic had left the university before the survey was conducted, and hence could not be contacted. Of those who were surveyed, the response rate was 47 percent (160 of 343 students emailed). The response rate was much higher among better-performing students (those who achieved better than a bare pass) at 53 percent, as against 32% for weaker students. The response rate was also slightly higher for females than for males (53% and 42% respectively), and those for whom the topic was *not* mandatory (56%, as against 44% for those for whom the

topic was mandatory). The bias towards better-performing students responding suggests that the results may not be fully representative of the enrolled student body. However, the results (presented below) indicate that better-performing student respondents only answered one question (Q1) significantly differently to weaker ones. Thus, in many respects, we might expect that the results reflect the perceptions of the enrolled student body.

In their other topics, students in the main experienced teacher-driven tutorials, so we asked students to compare the collaborative learning approach of the microeconomics tutorials with the traditional tutor-driven tutorials they had attended. The questionnaire (see Appendix 2) asked: 'To what extent do you agree with these statements about ECON 1002 Micro-economics tutorials'. The first statement was: 'Helped me to settle into uni quickly.' Students had the options of strongly disagreeing, mainly disagreeing, indicating that they were not sure, mainly agreeing or strongly agreeing.

The questionnaire results are summarized in Tables 1, 2a, and 2b. (In these tables the questions have been abbreviated. The full questions are listed in Appendix 2.) The first two questions relate to the social benefits of the tutorial method; questions 5 and 10 are mainly about developing small group communication skills; and questions 3, 4, 6-9 and 11-13 are about learning benefits.

Table 1. Result of student survey (160 responses)

	Percentages				
	Strongly agree	Mainly agree	Not sure	Mainly disagree	Strongly disagree
1. Helped me settle into Uni quickly	16.9	51.9	19.4	10.6	1.3
2. Developed personal relationship with tutor	13.1	43.1	22.5	15.6	5.6
3. Encouraged me to attend tutorials*	22.6	45.9	13.8	12.6	5.0
4. Encouraged me to study topic content	23.8	50.0	12.5	11.9	1.9
5. Developed small group communication skills	25.0	51.9	12.5	6.9	3.8
6. Helped focus on key ideas in tute questions*	30.8	49.1	11.9	6.9	1.3
7. Helped me understand other students' views*	25.8	44.7	20.8	7.5	1.3
8. Clarified material after small group discussion*	38.4	39.0	13.2	6.9	2.5
9. Helped me understand difficult concepts	29.4	51.9	7.5	8.1	3.1
10. Showed me how other students approach problems	23.8	52.5	15.0	6.3	2.5
11. Helped me add what I learned from others	21.3	55.0	13.1	7.5	3.1
12. Helped me make better sense of tutor's explanation*	28.3	42.1	17.0	7.5	5.0
13. Helped me prepare for tests*	43.4	40.9	8.8	5.7	1.3
14. Encouraged me to take further ECON topics	16.9	36.3	31.3	13.1	2.5
15. Were improved by tutor's involvement	36.3	37.5	14.4	5.0	6.9

*Note: * indicates one student did not answer*

Table 1 indicates that students generally saw benefits in the collaborative approach. Except for questions 2 and 14, more than two-thirds of students either strongly or mainly agreed that the approach was beneficial. For questions 2 and 14, a larger percentage of students were unsure of the benefits (for question 2, about one-quarter; for question 14, about one-third). It is interesting that the approach was not very successful in developing a personal relationship with the tutor, and that approximately half of the students felt encouraged to take further economics topics. Agreement on the value of the method was very high on some questions. For questions 5, 6, 9 and 13, more than 80 percent of respondents indicated agreement. The responses indicate that a clear majority of students saw social, learning and skill development benefits in the tutorial format.

Tables 2a and 2b focus on whether or not students agreed with a question - that is whether they either strongly agreed or mainly agreed, against being not sure or disagreeing. These responses were cross-tabulated against student characteristics (such as sex), and the Pearson chi-square test for independence (see SPSS, 1990, p.130) was carried out to assess whether category percentages (e.g. as between males and females who agreed) were significantly different.

Table 2a. Percentages agree, cross-tabulated against student characteristics

	Sex			English 1st language			Help career			Econ mandatory			Econ high school			Comfortable maths		
	Male	Female	Sig.	Yes	No	Sig.	Yes	No	Sig.	Yes	No	Sig.	Yes	No	Sig.	Yes	No	Sig.
1 . Helped me settle into Uni quickly	70.4	67.1		71.1	58.1		65.5	79.1		69.6	66.7		75.4	65.0		72.2	53.8	*
2. Developed personal relationship with tutor	55.6	57.0		57.0	51.6		56.0	58.1		51.4	90.5	***	52.6	58.3		60.9	34.6	**
3. Encouraged me to attend tutorials	59.3	77.2	**	68.0	67.7		62.1	83.7	**	66.7	81.0		66.7	68.9		70.5	57.7	
4 . Encouraged me to study topic content	64.2	83.5	*	73.4	74.2	*	67.2	93.0	***	73.2	81.0		64.9	78.6	*	75.9	61.5	
5. Developed small group communication skills	67.9	86.1	***	78.9	67.7		75.9	81.4		76.1	85.7		73.7	78.6		78.9	65.4	
6. Helped focus on key ideas in tute questions	72.8	86.1	*	80.5	74.2		75.0	90.7	**	81.2	71.4		80.7	78.6		83.3	61.5	**
7. Helped me understand other students' views	65.4	74.7		70.3	67.7		69.8	69.8		69.6	76.2		73.7	68.0		73.7	56.0	*
8. Clarified material after small group discussion	70.4	83.5	*	79.7	64.5	**	76.7	76.7		76.1	85.7		87.7	70.9	**	80.3	61.5	**
9 . Helped me understand difficult concepts	79.0	83.5		84.4	67.7		79.3	86.0		79.7	95.2	*	86.0	78.6		85.0	65.4	**
10. Showed me how other students approach problems	70.4	82.2	*	77.3	71.0		73.3	83.7		74.6	90.5		78.9	74.8		78.9	61.5	*
11. Helped me add what I learned from others	69.1	83.5	**	78.9	64.5	*	75.9	76.7		73.9	95.2	**	84.2	71.8	*	78.9	65.4	
12. Helped me make better sense of tutor's explanation	61.7	78.5	**	71.9	61.3		67.2	79.1		69.6	76.2		68.4	70.9		73.5	53.8	**
13. Helped me prepare for tests	82.7	84.8		85.2	77.4		81.9	88.4		83.3	90.5		84.2	83.5		84.1	84.6	
14. Encouraged me to take further ECON topics	53.1	53.2		53.1	54.8	*	50.0	60.5		54.3	47.6		63.2	47.6	*	54.9	42.3	
15. Were improved by tutor's involvement	75.3	72.2		75.8	64.5		73.3	76.7		71.0	95.2	**	75.4	72.8		76.7	57.7	**

*Note: * indicates category percentages (eg as between males and females) were significantly different at the 10 percent level,*
*** at the five percent level and *** at the one percent level*
51% of respondents were male; for 80%, English was their first language; prior to taking the topic, 73% thought economics would help their career; 87% of students were required to take the topic in their degree, 35% studied economics at high school and 84% were comfortable in learning concepts that take a mathematical approach

Table 2b. Percentages agree cross-tabulated against student characteristics

	Straight Uni			Good result			Higher grade			Q14 Encouraged			
	Yes	No	Sig.	Yes	No	Sig.	Yes	No	Sig.	Yes	No	Sig.	Yes
1. Helped me settle into Uni quickly	63.4	76.1	*	75.0	43.8	***	78.8	61.3	**	78.8	57.3	***	76.3
2. Developed personal relationship with tutor	49.5	65.7	**	59.4	43.8		59.1	54.8		67.1	44.0	***	71.2
3. Encouraged me to attend tutorials	64.5	73.1		70.3	61.3		71.2	66.3		83.5	51.4	***	80.3
4. Encouraged me to study topic content	73.1	74.6		75.8	65.6		78.8	69.9		85.9	60.0	***	82.2
5. Developed small group communication skills	75.3	79.1		79.7	65.6	*	81.8	74.2		84.7	68.0	**	84.7
6. Helped focus on key ideas in tute questions	79.6	79.1		82.8	67.7	*	83.3	77.2		92.9	65.3	***	83.8
7. Helped me understand other students' views	66.7	74.6		74.0	56.3	**	72.3	69.9		78.8	60.8	**	73.7
8. Clarified material after small group discussion	79.6	73.1		79.7	67.7		81.8	75.0		90.5	62.7	***	82.9
9. Helped me understand difficult concepts	86.0	74.6	*	84.4	68.8	**	81.8	80.6		91.8	69.3	***	89.0
10. Showed me how other students approach problems	78.5	73.1		78.1	68.8		77.3	75.3		83.5	68.0	**	83.1
11. Helped me add what I learned from others	78.5	73.1		77.3	71.9		69.7	80.6		90.6	60.0	***	81.4
12. Helped me make better sense of tutor' explanation	72.0	67.2		73.2	59.4		72.7	68.5		84.7	54.1	***	82.2
13. Helped me prepare for tests	80.6	88.1		85.8	78.1		86.4	82.2		92.9	74.3	***	89.8
14. Encouraged me to take further ECON topics	55.9	44.3		56.3	40.6		54.5	51.6		n/a	n/a	n/a	59.3
15. Were improved by tutor's involvement	68.8	80.6	*	76.6	62.5		78.8	69.9		82.4	64.0	***	n/a

*Note: * indicates category percentages (eg as between males and females) were significantly different at the 10 percent level,*
*** at the five percent level and *** at the one percent level.*
58% of respondents started university straight from school; 41% had better than expected results; 80% achieved a grade of credit or higher.
'Yes' for Q14 'Encouraged' indicates that students agreed that student led tutorials encouraged them to take further economics topics. 'Yes' for Q15 'Tutor involvement' indicates that students agreed that student led tutorials were improved by the tutor's involvement.

Table 2a breaks the responses down by sex, whether or not English was the student's first language (Q19), whether or not, before taking the topic, students thought that studying economics would help their career (Q16), whether the topic was a requirement for their degree (Q17), whether they studied economics at high school (Q18) and whether they were comfortable in learning concepts that took a mathematical approach (Q21). The table indicates that a significantly higher percentage of females than males agreed that the collaborative method encouraged them to attend tutorials (Q3, 77% as against 59%; see the comments relating to Q3, Q4 and Q6 below), that the method helped them to develop communication skills (Q5), and helped in understanding explanations (Q11 & Q12). Significantly more students for whom English was their first language agreed that the approach helped them to understand difficult concepts (Q9). Those who had thought, prior to taking the topic, that studying economics would *not* help their careers were significantly more likely to agree the method encouraged them to attend tutorials and study (Q3 & Q4), and to focus on tutorial questions (Q6). These three questions (Q3, Q4 and Q6) pertain to motivation – that is, encouraging the students to attend the tutorial, and study or focus on the material – and it is not clear as to whether it is the collaborative method used, or in fact, the tests, that have motivated these students. A significantly higher percentage of students for whom the topic was *not* mandatory (Q17) agreed that the approach helped them to develop a personal relationship with the tutor (Q2), were appreciative of the tutor's involvement (Q15), and agreed that the method helped them to assimilate the ideas of others (Q11). Students who took economics at high school were significantly more likely to agree the method was useful in clarifying material (Q8). Those students more comfortable in learning concepts that take a mathematical approach were significantly more likely to agree that the approach helped them to develop a personal relationship with the tutor (Q2), helped them to focus on tutorial questions (Q6, see also comments regarding motivation above), helped to clarify the material after the small group discussion and their understanding of difficult concepts (Q8 & Q9), and helped them to make better sense of the tutor's explanation and were more appreciative of the tutor's involvement (Q12 and Q15).

Table 2b breaks down responses according to whether or not students came straight from school (Q20), whether or not they achieved a better result than they had expected (Q22), whether or not they achieved a credit grade or better, whether or not they were encouraged to take further economics topics (Q14), and whether or not they agreed that the tutorial was improved by the tutor's involvement (Q15). Students *not* coming straight from school were significantly more likely to agree that the method

helped them develop a relationship with the tutor (Q2). Those who got better than expected results were significantly more likely to agree that the method helped them to settle into uni (Q1) and that it helped their understanding (Q7 & Q9). Students who got a higher grade were significantly more likely to agree that the method helped them to settle into uni (Q1). Those who were encouraged to take further economics topics (Q14), and those appreciative of the tutor's involvement (Q15), were much more positive about the method, with both groups indicating significantly greater agreement on most questions. (We also broke down the responses into those enrolled in economics-based degrees and those who were not, and found no significant differences in agreement percentages; 74% of respondents were enrolled in economics-based degrees).

6. CONCLUSION

The collaborative learning method was generally well received by students, with a clear majority seeing social, learning and skill development advantages. Some student groups were more positive than others. For example, female students tended to be more positive than males, especially in agreeing that the method enhanced communication skills, encouraged them and promoted understanding. Those who obtained a better than expected grade were also generally more positive. The tutorial method did not seem to markedly encourage students to take further economics options, but the 53 percent of students who were encouraged were generally very positive about the collaborative teaching approach. The manner in which tutors interacted with students was important. Students who appreciated the tutor's involvement were much more positive about the method. This suggests that some positive perceptions of the collaborative approach stemmed from the tutor's skill in teaching. Even so, a majority of students who were not positive about the tutor's involvement saw learning advantages in the method. Of course, as Becker (2004) argues, it is very difficult to disentangle the influences of good teaching and good teaching methods. It is also apparent that different tutorial formats may be optimal in different fields and levels of study, so one should be cautious of generalizing our experience to other topics or student levels, or assuming that positive student perceptions necessarily imply actual improved performance.

APPENDIX 1

Sample Tutorial Questions

Tutorial exercise questions generally comprised a mixture of 6 to 10 review and problem solving questions, for example -:

(extract from Tutorial No. 12:

Why is a monopolist's demand (D) and marginal revenue (MR) curve downward sloping?

- Table 1 reveals the price, quantity and STC information of a monopolist producing good Y.
- Compute and enter the values for the incomplete TR, MR, SMC, SATC, economic profit and arc price elasticity of demand columns.

Table 1

Q of Y	Price (P) ($)	TR ($)	MR ($)	STC ($)	SMC ($)	SATC ($)	Econ. Profit ($)	Arc price E of D
0	7.00			20,000				
10,000	6.00			40,000				
20,000	5.00			55,000				
30,000	4.00			75,000				
40,000	3.00			100,000				
50,000	2.00			130,000				
60,000	1.00			170,000				
70,000	0.00			220,000				

Sample Test Questions

Extract from Tutorial Test No. 6

1. A monopolist is currently charging $24.00 for its product. It is selling 12,000 units of output. Its price E of D at this price and quantity is –2.5. If the monopolist wants to increase its sales revenue, should it raise or lower its price? Explain.

2. You are provided with the following table relating to a monopolist:

Q of Y	Price (P) ($)	TR ($)	MR ($)	STC ($)	SMC ($)	SATC ($)	Econ. Profit ($)	Arc price E of D
0	5.00	0	-	20,000	-	-	-50	
100	4.00	400	4.00	40,000	.50	1.00	300	-9.00
200	3.00	600	2.00	55,000	2.00	1.50	300	-2.33
300	2.00	600	0.00	75,000	3.00	2.00	0	-1.00
400	1.00	400	-2.00	100,000	4.00	2.50	-600	-0.43
500	0.00	0	-4.00	130,000	5.00	3.00	-1,500	-0.11

What is the profit maximising output level and price? Why did you choose this output and price?

What is the monopolist's sales-revenue maximising output level and price? Why did you choose this output and price?

1. APPENDIX 2

Micro-economics Student Survey
Flinders University

To what extent do you agree or disagree with these statements about ECON 1002 Micro-economics tutorials. The student-led tutorials...

	Strongly disagree	Mainly disagree	Not sure	Mainly agree	Strongly agree
	1	2	3	4	5
1. Helped me to settle into uni quickly.					
2. Developed a more personal relationship with my tutor.					
3. Encouraged me to attend the tutorials.					
4. Encouraged me to study the topic content.					
5. Developed my small group communication skills.					
6. Helped me to focus on the key ideas in the tute questions.					
7. Helped me to understand other students' views.					
8. Clarified the material for me after our small group discussion.					
9. Helped me to understand difficult concepts.					
10. Showed me how other students approached problems.					
11. Helped me to add what I learned from others into my own understanding.					
12. Helped me to make better sense of the tutor's final explanations.					
13. Helped me prepare for the tests.					
14. Encouraged me to take further ECON topics (if my degree structure allowed it.)					
15. Were improved by the tutor's involvement.					

NEXT

All queries relating to this survey can be sent to anne.gleeson@flinders.edu.au

2. _____

3.

4.

5.

6.

7.

8.

Micro-economics Student Survey
Flinders University

	Yes	N
16. Before taking micro-economics I thought studying economics would help my career.	○	○
17. Micro-economics was required for my degree.	○	○
18. Did you take an economics subject in High School?	○	○
19. Is English your first language?	○	○
20. Did you start university straight after High School?	○	○

21. To what extent do you agree with the following statement?

	Strongly disagree	Mainly disagree	Not sure	Mainly agree	Strong agre
	1	2	3	4	5
I feel comfortable in learning concepts that take a mathematical approach (that is, using symbols to stand for concepts, uncomplicated mathematical expressions and uncomplicated graphs).	○	○	○	○	○

	lower	same	high
22. How did the final grade you received for ECON 1002 compare with what you expected to receive when you enrolled for the topic?	○	○	○

Your gender: M

Your degree:

So that we can validate your input and enter you in to the prize draw, please enter your **WebCT/email username and password**, then click "Finish".

Username:

Password:

Finish

All queries relating to this survey can be sent to anne.gleeson@flinders.edu.au
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