

Peer Instruction in the Humanities

Monash University

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<http://www.arts.monash.edu.au/philosophy/peer-instruction/>

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1. Project outline

Peer Instruction (PI) is a highly innovative and proven technique for generating active learning in medium to large enrolment lecture classes. The aim of this project is to facilitate and encourage the adoption and evaluation of PI in philosophy and the humanities throughout the higher education sector in Australia.

1.1 Peer Instruction

Peer Instruction is a simple way to incorporate some genuine interaction and engagement in lectures. It is cheap, simple to implement, and delivers useful feedback to both students and to the lecturer. Typically, the method works in the following way. After lecturing on a topic for 10-15 minutes, the lecturer stops and asks a multiple-choice quiz question that tests students' understanding of the topic under discussion. These questions (sometimes called *ConcepTests*) are often designed to test common misunderstandings of the topic. All the students in the class then "vote" on the answer to the question. This can be done in a number of different ways; using an electronic response system ("clickers"), flash cards, or simply by show of hands. (See section 6 below for more detail).

If most students have the right answer, the lecturer can confirm it and move on. If most have the wrong answer, this suggests the lecture was opaque and the students didn't get it. The lecturer can then double back and explain the topic again or give some hints before trying again with the same (or a different) question.

If there is a mixture of answers, students are given a few minutes to discuss the question with their neighbours and try to persuade them that their answer is correct. The whole class then gets to vote a second time. Typically, more students give the correct answer the second time around; students with the right answer usually convince others of it. The lecturer can then confirm the answer and move on, either to another question, or to the next topic in the lecture.

The advantages of these interactive lectures over the traditional format are many and varied:

- The 'convince-your-neighbour' sessions allow for valuable peer interaction between students that promotes active engagement and critical reasoning: students move beyond passive assimilation of material in the effort to think about and explain it to someone else.
- The convergence on the correct answer following these student-student discussions suggests that brief one to one discussion is an invaluable learning tool. Students who have understood the topic are able to explain it effectively to students who have not, perhaps at times more effectively than the lecturer.
- The *ConcepTest* questions provide the lecturer with instant feedback about how well students have understood the material, allowing them to adjust the pace and content of their teaching accordingly.
- The questions provide valuable feedback to the student on how well they have actually understood the material and how they are progressing relative to the rest of the class.
- The anonymous nature of the voting system encourages participation by, not just some, but *all* students. This is most apparent when an electronic response system is used, but also holds to a lesser extent when flashcards are used, especially in very large lectures.

This makes it much easier for students who would not normally participate by publicly answering questions to engage with the material being taught.

- The monotony of the traditional lecture is avoided by breaking up the lecture into short segments interspersed with a sequence of questions in which students must actively engage with the material. In this way, student concentration is increased.

Although PI has been successfully adopted in the sciences, its potential in the humanities remains largely untapped. With a few exceptions PI has yet to be adopted in disciplines such as philosophy, logic, critical thinking, linguistics, history, geography, politics or comparative literature. Given the importance of conceptual understanding and critical engagement in these disciplines, it is clear that the Peer Instruction method has enormous potential in this context.

The aim of the current project is to lay the foundations for the adoption of PI in undergraduate teaching in the humanities, by implementing and evaluating the method in philosophy subjects and disseminating the results as broadly as possible.

1.2 Planned outcomes and deliverables of the project

1. Creation and development of a large number of *ConcepTest* questions (approx. 100-200) for use in lecture-based philosophy undergraduate courses.
2. Creation of the *Peer Instruction* website, allowing for the sharing of *ConcepTest* questions, details on the method, test results and relevant publications.
<http://www.arts.monash.edu.au/philosophy/peer-instruction/>
3. Creation and development of additional materials for potential adopters in the humanities; information, guidelines and references on the use of the *Peer Instruction* method and instruments for course evaluation, disseminated on the dedicated website and in cross-faculty workshops.
4. Research reports on the effectiveness of the method in philosophy courses, to be measured by student evaluations and comparative studies of examination results.

1.3 Project Team

Project Leaders

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Dr. Sam Butchart, School of Philosophy and Bioethics, Monash University.

Dr. Toby Handfield, School of Philosophy and Bioethics, Monash University.

Research Partners

Professor Ian Gold, Philosophy Department, McGill University.

Professor Graham Oppy, School of Philosophy and Bioethics, Monash University.

Dr. Fiona Leigh, School of Philosophy and Bioethics, Monash University.

Associate Professor Greg Restall, Philosophy Department, University of Melbourne.

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Dr. Jeremy Aarons, School of Philosophy and Bioethics, Monash University.

External Reference Group

Associate Professor Mark Peel, Associate Dean of Academic Programs (Arts), Monash University.

Professor Graham Webb, Pro Vice Chancellor (Quality), Monash University.

Associate Professor Tim van Gelder, University of Melbourne.

Professor Ian Gold, McGill University.

2. Project Outcomes

2.1 Trials of Peer Instruction in philosophy

As planned, PI was used and evaluated in the following courses in 2007:

Semester one

1. PHL1010: *Life, Death and Morality* (Ethics). Toby Handfield, Monash University, School of Philosophy and Bioethics.
2. PHL1010: *God, Freedom and Evil* (Philosophy of Religion). Steve Gardner and Graham Oppy, Monash University, School of Philosophy and Bioethics.
3. 161-115: *Logic* (Formal Logic). Greg Restall, University of Melbourne, Department of Philosophy.

Semester two

4. PHL1030/2030: *Thinking: Analysing Arguments* (Critical Thinking). Sam Butchart, Monash University, School of Philosophy and Bioethics.
5. PHL2130: *Plato and Platonism* (Ancient philosophy). Fiona Leigh, Monash University, School of Philosophy and Bioethics.

We had originally planned to trial PI in an additional philosophy course at Monash in semester 2: *Time, Self and Freedom* (metaphysics). However, we decided to drop this course from the trial since it was undergoing substantial revision and we did not consider it desirable to try out a new teaching technique at the same time.

All of the above courses are single semester (13 week) units. All are first-year courses except PHL2130, which is a second year course and PHL1030/2030 which is a combined first and second year course. Peer Instruction was used in the lectures, using flash cards as the voting mechanism. Approximately 2-6 questions were used in each lecture, though this varied from course to course.

2.2 Evaluations of the effectiveness of PI

2.2.1 Student evaluations

The use of PI was evaluated in all of the subjects listed above using a student questionnaire. We have consistently found the response from students to be overwhelmingly positive. In all the courses a majority of students said that PI helped with understanding and attention in lectures. Nearly all the students enjoyed the discussion sessions and found them useful.

For each course evaluated, we compiled a summary report which lists the responses to four key questions and a full report, which lists the responses and comments to all questions. All these reports have now been published on the website:

<http://arts.monash.edu.au/philosophy/peer-instruction/evaluations/>

The summary reports are also included in Appendices A1-A7 of the current report.

Here we summarise the results from five of the philosophy subjects, so they can be more directly compared. We include the responses from four key questions and some sample comments.

	Critical Thinking (2006)	Ethics and Philosophy of Religion (2007)	Formal Logic (2007)	Plato (2007)
Course duration	13 weeks	13 weeks	13 weeks	13 weeks
Approx. number of PI questions used per lecture	3-5	3-5	5-8	1-2
Number of students who completed questionnaire	34	84	29	20
Total enrolment	61	195	58	43
Response rate	56%	43%	50%	47%

Q2. The use of the multiple-choice questions and flash cards helped me to understand the material when I attended lectures.

	Critical Thinking	Ethics	Philosophy of Religion	Formal Logic	Plato
(6) Agree Strongly	56%	56%	46%	28%	35%
(5) Agree Moderately	35%	33%	36%	58%	40%
(4) Agree Slightly	9%	10%	13%	14%	25%
(3) Disagree Slightly	0%	1%	1%	0%	0%
(2) Disagree Moderately	0%	0%	1%	0%	0%
(1) Disagree Strongly	0%	0%	1%	0%	0%
Total agree	100%	99%	95%	100%	100%
Total disagree	0%	1%	3%	0%	0%
Mean	5.47	5.44	5.22	5.14	5.1
Std. Dev.	0.66	0.72	0.96	0.64	0.79

In all the courses in which PI was used, students overwhelmingly agreed that the method helped them to understand the lectures. 95-100% of students agreed with this statement, 28-56% agreed strongly. Below are some sample comments from students on this aspect of the use of PI.

Sample comments

Multiple choice questions throughout the lecture were very good in terms of practically using and understanding what he had just learnt about and consolidated my learning.

They were a good way to reinforce the theory we were learning in the lectures. I wanted to do more of the multiple choice questions. I felt they helped me understand the course material and gave me an opportunity to practice my critical thinking skills.

I think in this subject they are helpful as there can be many misconceptions.

.... When I got something wrong, and the right answer was explained, it helped my understanding.

Getting instant assessment for my answers which, when answers were explained, helped me understand things better. Also helped me to understand/made clear the things I was having trouble with.

Q6. The discussions with fellow students helped to improve my understanding of the topic.

	Critical Thinking	Ethics	Philosophy of Religion	Formal Logic	Plato
(5) Every time	21%	13%	12%	7%	0%
(4) Most of the time	32%	36%	36%	42%	30%
(3) Some of the time	41%	36%	31%	34%	40%
(2) Rarely	3%	14%	18	14%	30%
(1) Never	0%	1%	1%	3%	0%
Did not take part in discussions	3%	0%	2%	0%	0%
Some or all of the time	94%	85%	79%	83%	70%
Rarely or never	6%	15%	21%	17%	30%
Mean	3.79	3.45	3.40	3.34	3.0
Std. Dev.	0.91	0.94	0.97	0.94	0.79

The peer discussions appear to be a very popular part of the method. Participation levels are high, with only 2-3% of students reporting never taking part in discussions. From 85-94% of students said that they found the discussions helped improve their understanding of the topic all or some of the time.

Sample comments

It was really good how we gave our initial answer and then tried to ‘sell it’ to each other and then revote.

The discussion with other students is by far the most interesting and useful part of the experience. It allows a brief moment to gather one's thoughts and bounce them off another mind.

The discussion and back and forth really solidified my understanding of topics and theories.

Talking with other students allowed me to hear the information in a different way and consolidate it more thoroughly

Talking to students re. the question - I often found they explain things really well ;-)

Peer Instruction was also found to have positive effects on students’ participation and engagement during lectures. 99-100% of students agreed that the method made the lectures more interesting, with 59-79% agreeing strongly.

Q4. The use of the multiple-choice questions and flash-cards made the lectures more interesting.

	Critical Thinking	Ethics	Philosophy of Religion	Formal Logic	Plato
(6) Agree Strongly	79%	67%	60%	59%	25%
(5) Agree Moderately	18%	24%	27%	34%	50%
(4) Agree Slightly	3%	8%	11%	7%	25%
(3) Disagree Slightly	0%	1%	1%	0%	0%
(2) Disagree Moderately	0%	0%	0%	0%	0%
(1) Disagree Strongly	0%	0%	0%	0%	0%
Total agree	100%	99%	99%	100%	100%
Total disagree	0%	1%	1%	0%	0%
Mean	5.85	5.56	5.47	5.52	5.0
Std Dev.	0.44	0.70	0.74	0.63	0.73

We asked students what benefits they found from the use of PI in lectures. Not all students responded to this question, although the response rate was quite high, ranging from 71-83%. After reading through the comments, we found that the benefits students listed could be classified into four groups; improved understanding, increased interaction and engagement, useful feedback (to either the lecturer or the students themselves) and improved levels of attention.

Q10. What were the benefits (for you) of the multiple-choice questions and flash-cards (if any)?

Sample comments

Interaction and Engagement
It made lectures interactive and also gave me an opportunity to demonstrate if I had or hadn't grasped the material just taught and then if so, to clarify them ... they're fun and interesting!
I enjoyed being able to test my knowledge and ability to apply that knowledge right there in the lecture. It also broke up the lecture and gave us something to actively do instead of just passively listening and taking in the information. ... I wish more lecturers would use this method - well done!
It made the lectures more interesting and interactive. The primary advantage being that I could argue a point with other students. Partly because of this I found philosophy lectures far more engaging and memorable than my other lectures.
Forced me to engage with the material.
Improved understanding
They consolidated the content of the lecture and helped build confidence that the things I was taking from the lecture were the right ones. ... They should be done in more classes.
They were a good way to reinforce the theory we were learning in the lectures. I wanted to do more of the multiple choice questions I felt they helped me understand the course material and gave me an opportunity to practice my critical thinking skills.
the discussion and back and forth really solidified my understanding of topics and theories
Made things more interesting and intellectually stimulating; When I got something wrong, and the right answer was explained, it helped my understanding.

Feedback to students and lecturer
Cleared up misunderstandings. Sometimes I thought I understood and the flash cards showed that I hadn't.
Allowed me to see how I was doing in comparison with others in the class. I was not put down by being wrong, because I could see that at least I was not the only one who answered in a particular way. Also allowed the lecturer to address where and why people went wrong in their reasoning without singling out individuals. I hope it continues to be used, perhaps it will spread to other subjects ...
Let me know if I was on the right track and understanding the topic or not
Improved attention
Made me more alert during lectures. Helped sustain my attention and interest during the lecture. ... Good, innovative approach.
Broke up lectures a bit, kept me alert and focusing on the material.
It gave the lecture a short break so that we could concentrate better, as well as being interactive meant that you had to pay attention and follow the lecture.
Helped to gauge how well I had understood the topic. Also indicated my progress compared to the rest of the class.

We also asked students whether they thought there were any disadvantages to using PI. Response rates to this question were much lower than the 'benefits' question, ranging from 50%-72%. There was a much greater variety of disadvantages listed by students. For all the courses evaluated the most popular type of comment for this question was 'No disadvantages' (24-53% of comments). This was followed by 'not enough time given to think' (11-24% of comments) or (in the case of Formal Logic) 'takes up time' (24%).

Q11. What were the disadvantages (for you) of the multiple-choice questions and flash-cards (if any)?

Sample comments

No disadvantages
There were none, it was great, we should have that for every class.
None.
None really. If I wasn't sure of the answer I just abstained. Anyone uncomfortable with voting in front of everyone else could do the same, I suppose.
No disadvantages.
Not enough time given to think
I was not given enough time to think about the answer. Because of this, I ended up voting with the majority of people because I was unable to answer the question myself in the time given.
The questions often were worded in a way that required some thought to establish what they were asking. So sometimes there wasn't enough time to decide on the correct response
Sometimes not enough time was given to think about or compute the answer before voting was required.
Too easy to vote with the majority
Very easy to vote according to how the rest of the class votes.
If I didn't know the answer I would just put up the card, from what I could see, the majority had put up.
I reckon some people voted deliberately in conformity with the rest, which is a disadvantage of being able to see what everyone else is voting for.
Takes up time
Time consuming

Maybe takes quite a bit of time
I felt that the lectures had a slow pace when we used this system, but we didn't actually miss out on any material ...
Embarrassed when answered incorrectly
Sometimes if I was unsure of an answer it was embarrassing holding up the flash cards when others could see my answer, especially if I got it wrong!
Bright colours made me hesitant to answer when I realised my answer was different from others.
Discussions with peers not useful
I did not find the discussion part with the person sitting next to you very effective, because usually neither had a real logical reason to back up their answer, and this could lead us in the wrong direction.
Sometimes I wasn't sitting next to/near somebody so I couldn't discuss my ideas.
Sometimes I felt that speaking to my peers wasn't of much benefit as both parties were unsure. This, however, was not always the case.
Problems with questions
Can introduce confusion that did not exist before the questions was presented (when question was obscure).
Too bad if you don't understand the question.
Other
I listen online and they are not as effective this way.
Questions weren't posted over the internet to be accessible later.

As the above results show, our students identified many advantages to the use of PI in lectures, as well as some disadvantages. The crucial question from a pedagogical point of view is whether the advantages outweigh the disadvantages or vice versa. To find out what students thought about this, we asked the following question:

Q12. What (for you) was the balance of benefit vs. disadvantage from the use of the multiple-choice questions and flash cards in the lectures?

	Critical Thinking	Ethics	Philosophy of Religion	Formal Logic	Plato
(5) Definitely benefited	70%	59%	56%	52%	35%
(4) Benefits outweigh any disadvantages	18%	25%	24%	38%	55%
(3) Neutral	6%	8%	11%	10%	10%
(2) Disadvantages outweigh any benefits	0	0	1%	0%	0%
(1) Definite negative net value	0	0	1%	0%	0%
Not answered	6%	8%	8%	0%	0%
Total net benefit:	88%	84%	80%	90%	90%
Total neutral or net disadvantage:	6%	8%	13%	10%	10%
Mean	4.76	4.67	4.55	4.73	4.25
Std. Dev.	0.65	0.75	0.92	0.77	0.64

Q15. Any other comments on the use of the multiple-choice questions, flash-cards and discussions:

	Critical Thinking	Ethics and Philosophy of religion	Formal Logic	Plato
Response rate	53%	25%	45%	35%
Positive	100% (18)	67% (14)	84% (11)	43% (3)
Neutral	0%	29% (6)	8% (1)	43% (3)
Negative	0%	5% (1)	8% (1)	14% (1)

The majority of comments received for this question were positive (67-100%). Some comments were neutral (several of these consisted of suggestions for how the method could be improved or modified). Only two negative comments were received.

Sample comments

Positive
They're great! They are also good because they highlight times when a particular part of a concept hasn't been fully explained (or where people have misinterpreted the lecturer). I wish more lecturers would use this method - well done!
All lecturers should try incorporate them into their lectures. Its a great idea and kept us active during the lecture. Would definitely help with the 'boring' factor a LOT of other lectures have.
Multiple choice questions throughout the lecture were very good in terms of practically using and understanding what he had just learnt about and consolidated my learning. I also think that they make [the lecturer] feel good about his teaching because it always seems like most people are paying attention and learning stuff! Flash cards are fun! Discussions are good for reasons mentioned previously.
They're fun and interesting!
It's awesome!
Promoted discussion among class members (good thing). Encouraged progress and understanding.
They should be used in teaching in many other faculties.
They are good! Stops people from falling asleep and most importantly makes you think in lectures rather than just take what is given - better learning.
The discussions were really beneficial, and the relaxed approach to the lecture allows us to think and feel confident in asking questions.
The flash-cards are good because they allow us to communicate with the lecturer more. Sometimes in lectures in other subjects I feel as if I am just having a speech thrown at me and cannot contribute in any way, whereas the cards make me feel as if I am benefiting more from lectures because I contribute and learn more.
I think it is a very good technique seeing as there are topics in philosophy that require in-depth thinking and discussion and a constant need for confirming correct understandings of the material, as is discussing with peers as you are exposed to other ideas and approaches.
...Students have a tendency to not participate if they are singled out to give a response, but with everybody responding simultaneously, it creates a more dynamic and engaged studying environment. I hope it continues to be used, perhaps it will spread to the other subjects, and perhaps eventually they will build electronic multiple choice buttons built into the chairs :).
Neutral
Instead of having to discuss the multi choice questions with a person next to us perhaps (this is only a suggestion) it would be beneficial if the class was open to discuss their own views voluntarily on why they decided on the answer they chose and thus tried to sway others in order to establish a

majority vote if the responses were mixed.
There should be more instances of students being asked to justify their answer.
Negative
Discussion just do not seem effective, and flash cards should mainly be used for the benefits of the lecturer to see if students are understanding the concepts. ... As a student who sits in the lecture, it is obvious that a lot of people wait for others to hold up their cards and then hold up theirs which is the majority so as they wont feel singled out of basically an 'idiot'.
Not very efficient.
Most questions were good but some I thought was unnecessary (when most people got the answers right)

2.2.2 Examination and test results

In addition to student evaluations, we also planned to evaluate the effectiveness of PI on students learning outcomes using more objective measures such as examination results and test scores. We found a clear, if somewhat modest improvement in critical thinking skills in when PI was used in the lectures for the Monash critical thinking course, PHL1030. In the other philosophy subjects, the results are more difficult to interpret. In the Monash ethics course PHL1010, there was a noticeable improvement in average examination scores of about 3% when PI was first used in 2006 compared to previous years. This improvement was not sustained when PI was used in the same course in 2007 – average exam scores dropped 9%. In the formal logic course taught at the university of Melbourne, average exam scores increased by 9% when PI was used in 2007 compared to 2006. These results are described in more detail below.

Although we have found some supporting evidence for the effectiveness of PI in terms of student learning, no clear conclusions can yet be drawn. We plan to continue to analyze the data on student achievement which we have available in more detail and will report the results on the website where appropriate.

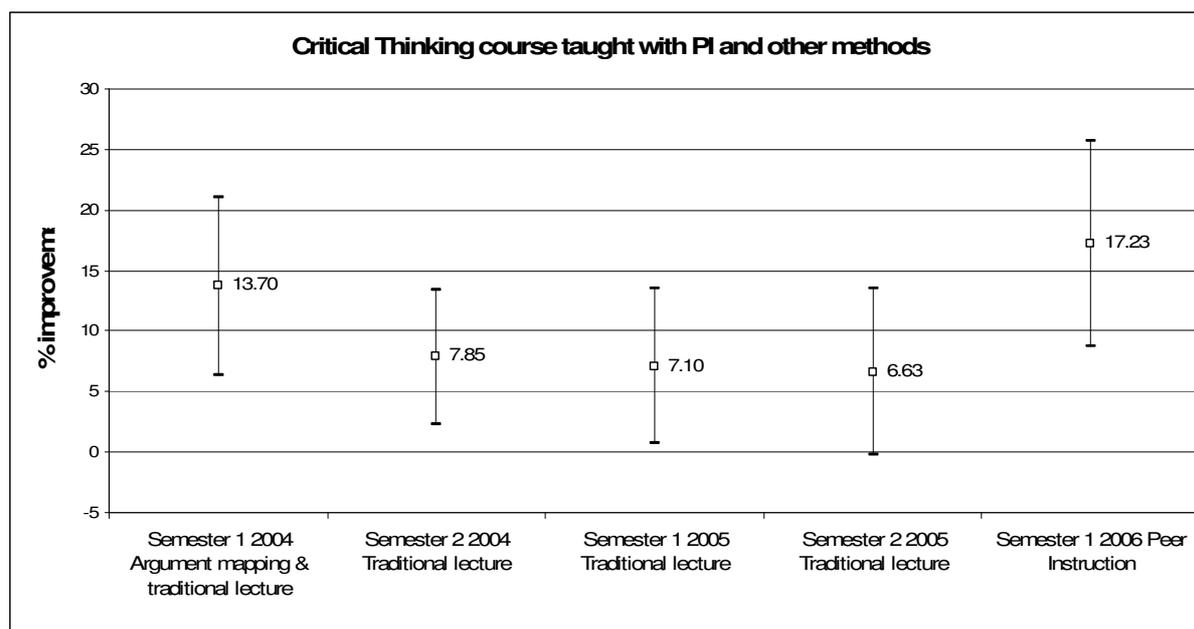
PHL1030: Thinking: Analyzing arguments

Students in this course were pre- and post-tested using a standardised test of critical thinking ability, the California Critical Thinking Skills Test (CCTST). 40 of the students enrolled in the course completed both pre- and post-tests and gave permission for their scores to be used as data for the study. The sample consisted of 18 females and 22 males. Ages ranged from 17 to 26. The median age was 19 years, the mode (most frequent age) was 18 years (30%). The largest proportion of students were in their first year of university (52.5%) and enrolled in an Arts degree (57.5%).

Students showed a statistically significant gain in critical thinking test scores of $17.23\% \pm 8.5\%$. For comparison, students enrolled in the same course in semester 2 2004, taught without PI, showed an average improvement of just $7.85\% \pm 5.5\%$.

The chart below compares this result to that obtained in previous semesters, in which the course was taught using a variety of pedagogical methods. PI compares favourably with the most successful method we have investigated – intensive computer-assisted argument mapping exercises (Semester 1, 2004).

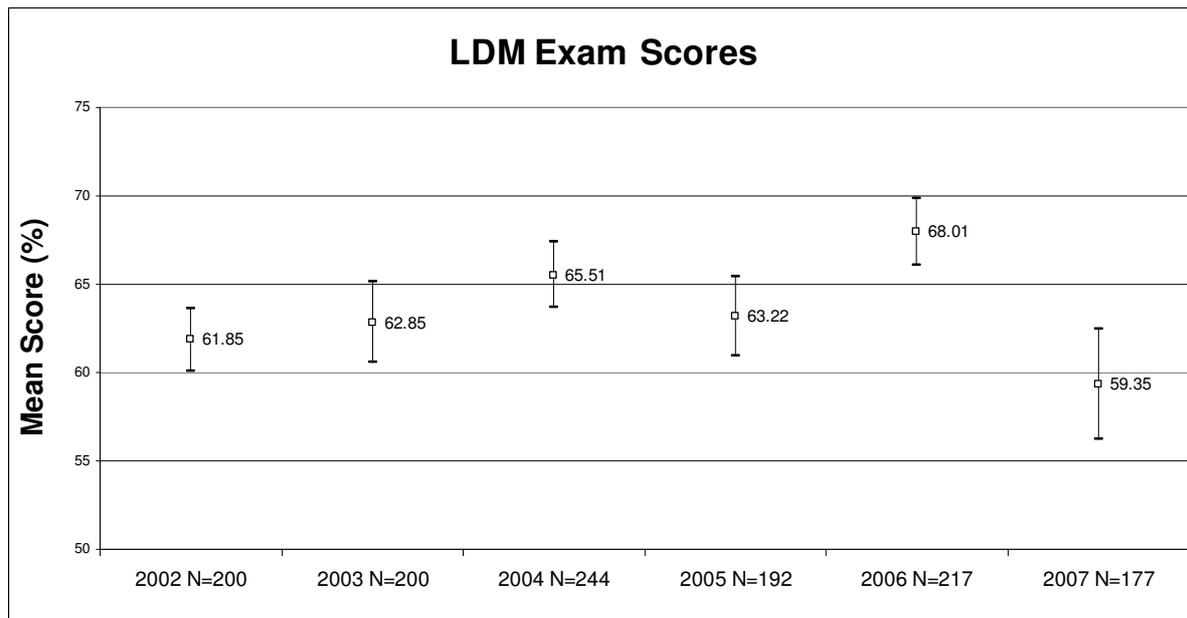
Semester	N	SD	Mean improvement (%)	95% lower	95% upper
S1 2004	43	21.08	13.70	6.31	21.08
S2 2004	65	22.36	7.85	2.31	13.39
S1 2005	41	20.27	7.10	0.70	13.49
S2 2005	49	23.93	6.63	-0.24	13.51
S1 2006*	40	26.64	17.23	8.7	25.75



PHL1010: Life, Death and Morality.

For PHL1010, we examined average examination results, comparing mean scores in 2006 and 2007 (when PI was used) to previous years, when PI was not used. The improvement in PHL1010 exam results noted when PI was first used in that course in 2006 was not replicated in 2007. In 2006, the mean exam score was 68% (whereas previous semesters had ranged from 61-65%). However in 2007, the mean exam result for this course was just 59%. Here are the results in more detail (PI used in 2006 and 2007):

Year	N	Mean (%)	SD	95% lower	95% upper
2002	200	61.85	12.75	60.08	63.62
2003	200	62.85	16.6	60.55	65.15
2004	244	65.51	14.71	63.66	67.36
2005	192	63.22	15.83	60.98	65.45
2006*	217	68.01	14.12	66.12	69.89
2007*	177	59.35	21.25	56.22	62.48



The low results in 2007 may be due to changes in the exam itself. In particular, the exam in 2007 was different in two ways:

1. There was a compulsory question. Students had one compulsory question and then chose three from the remaining five. In the past, they chose four from six.
2. The compulsory question was on cultural relativism, a relatively hard topic, whereas in 2006 cultural relativism was not covered at all. Instead, there was more material on impartiality, and the exam question on this topic was relatively easy.

These problems make the variation in examination results difficult to interpret. One solution we are considered might be to examine average results for the course as a whole, which would include not only exam results but students assignments submitted during the course of the semester. Once this analysis has been completed, the results will be published on the website, along with data from the two other philosophy subjects, *God, Freedom and Evil* and *Plato and Platonism*.

161-115: Logic

In Greg Restall's formal logic course at the University of Melbourne, we also examined average exam results. The mean score In 2007, when PI was used was 68%, whereas in 2006 the mean was just 58% . The mean difference of 9.6% is statistically significant at the 0.05 level; the 95% confidence interval for the difference in means is [1.54, 17.6]. Here are the results in more detail:

Year	N	Mean (%)	SD	95% lower	95% upper
2006	79	58.34	25.08	52.72	63.96
2007*	56	67.95	20.63	62.42	73.47
Difference		9.60		1.54	17.67

2.3 Website and resources

The *Peer Instruction in the Humanities* website has been completed as planned. It can be accessed at:

<http://arts.monash.edu.au/philosophy/peer-instruction/>

The website contains a wealth of information and resources on using Peer Instruction. The table below lists the main pages and describes their contents.

Page	Description
About Peer Instruction	
About Peer Instruction	Brief summary.
What is Peer Instruction?	A description of the PI method.
Why Use Peer Instruction?	A list of some of the many advantages of PI in lectures with references to the literature.
Peer Instruction in Philosophy and the Humanities	Notes on the potential of PI in the humanities.
How to Use Peer Instruction	Overview of the website and links to pages in the Using Peer Instruction section.
Using Peer Instruction	
Format of lectures	Detailed flowchart for a PI lecture.
Voting mechanisms	Notes on the comparative advantages of various voting mechanisms: show hands, flash cards and personal response systems.
Hints and tips on using PI in lectures	Hints and tips on implementing PI: what to do and what to avoid.
Designing a PI lecture	Notes on how to plan and design a PI lecture.
An example PI lecture	Transcript of a PI lecture in critical thinking, including PowerPoint slides.
Types of question you can ask in lectures	Eight pages on some of the different types of questions that can be asked in lectures, with several example questions of each type.
Questions about theories and principles	
Questions about concepts, definitions and distinctions	
Questions about arguments	
Worked examples	
Using questions to introduce a topic	
Opinion polls and discussion questions	
Puzzles and paradoxes	
Demonstrations	
General advice on writing multiple-choice questions	Links to articles and websites on designing good multiple-choice questions for higher education.
Evaluations	
Evaluations of PI	Student evaluations and test results for courses using PI.
Critical Thinking	Reports on student evaluations and critical

PHL1030: Thinking: Analysing Arguments, 2006 and 2007	thinking pre/post test results.
Ethics PHL1010: Life, Death and Morality, Monash University, 2007	Student evaluations
Philosophy of religion PHL1010: God, Freedom and Evil, Monash University, 2007	Student evaluations
Formal logic 161-115: Logic, University of Melbourne, 2007	Student evaluations
Ancient philosophy PHL2130: Plato and Platonism. Monash University, 2007	Student evaluations
Geography and environmental science GES1070: Extremes: Natural hazards and human vulnerability. Monash University, 2007	Student evaluations
Report on the applicability of Peer Instruction in four humanities disciplines: Classics, Politics, History and Geography.	A report on the use of PI at Monash in other humanities disciplines.
Lecturers who have adopted PI	Testimonials from lecturers in the humanities who have used PI as a result of this project.
Resources for evaluation	Resources for lecturers wishing to carry out their own evaluations of PI in the courses: downloadable student and lecturer questionnaires.
Resources	
Question Database	Database of ready to use concepTest questions for the humanities. For each subject area, the questions are further divided into topics. See section 2.2 for further details.
Critical Thinking	65 questions.
Ethics	54 questions.
Philosophy of Religion	67 questions.
Formal Logic	76 questions.
Philosophical logic	38 questions.
Ancient Philosophy: Plato	12 questions.
References	An extensive bibliography on PI, including a downloadable <i>EndNote</i> library containing all the references.
Useful links	Links to relevant external websites on PI.
Other resources	Miscellaneous other resources, including PDFs for flashcards.
Contribute	
Contribute your questions	How to contribute questions for the database.
Send us your comments	Comments and feedback on the project.

Project Information	
People	List of personnel
Funding	Acknowledgement of funding from the Carrick Institute.
Contact us	Email address for the project

2.4 Creation of the online Question Database

One of the main aims of this project is to assist potential adopters by providing a collection of well-designed ConcepTest questions that have been tested in class and proved to be useful. These questions have been made freely available on the Peer Instruction in the Humanities website, so that anyone interested in using PI has easy access to a number of ready-to-use, adaptable questions which they can quickly incorporate into their own teaching.

We created a large number of ConcepTest questions for each of the five courses listed above. Sam Butchart wrote most of these, working in close collaboration with the lecturers. Draft questions were written, then refined, edited or discarded. The lecturers themselves then chose which questions to use and made notes of which ones worked well and which did not. After the end of the semester, the most effective questions were chosen and uploaded to the ‘Question Database’ on the website:

<http://arts.monash.edu.au/philosophy/peer-instruction/database/>

We now have a total of 312 ConcepTest questions in the database on a wide variety of topics in critical thinking, ethics, philosophy of religion, logic and ancient philosophy. The database is organised hierarchically by subject area and topic. Visitors are encouraged to share ConcepTest questions they have created by emailing them to use so that they can be added to the database. The subjects and topics available, along with the number of questions in each section are shown below:

2.2.1 Critical Thinking (65)

- Identifying arguments (7)
- Argument analysis (15)
- Truth and validity (15)
- Assumptions (unstated premises) (5)
- Arguments from authority (1)
- Generalisations (3)
- Explanations (5)
- Conditionals (7)
- Inductive arguments (7)

2.2.2 Ethics (54)

- Utilitarianism (19)
- Rights (7)
- Killing in self-defence (3)

- Hobbesian moral theory (4)
- Equality (8)
- Abortion (12)
- Miscellaneous (1)

2.2.3 God and Religion (67)

- Ontological arguments (10)
- Cosmological arguments (8)
- Design arguments (12)
- Pascal's wager (3)
- The problem of evil (16)
- Miscellaneous arguments for the existence of God (18)

2.2.4 Formal Logic (76)

- Propositional logic: Translation (8)
- Truth tables (23)
- Propositional logic: Trees (9)
- Predicate logic: Translation (12)
- Models for predicate logic (7)
- Predicate logic: Trees (13)
- Definite descriptions (4)

2.2.5 Philosophical Logic (38)

- Paradoxes of material implication (38)

2.2.6 Ancient Philosophy: Plato (12)

- Gorgias (1)
- Meno (1)
- Phaedo (2)
- Republic (7)
- Parmenides (1)

2.5 Trials of Peer Instruction in additional humanities courses

With the help of some additional funds obtained from the Monash Arts Faculty, we also attempted to investigate the usefulness of PI in several other humanities disciplines. A research assistant, Dr Jeremy Aarons, was engaged, and four academics teaching in four different branches of the humanities were recruited to collaborate in the research. The researchers spent time learning about the curriculum of the subjects to be studied, and conceived of possible ConcepTest questions to be used if Peer Instruction were to be trialled in those units. The courses investigated were:

Classics: CLA1110 *Introductory Latin*

Politics: PLT2150 *Progress and Despair: Modern Political Ideologies and Theories*

History: HSY2045 *Decoding the Da Vinci Code: histories behind the story*

Geography: GES1070 *Extremes: Natural Hazards and Human Vulnerability*

Three of the four teachers (classics, history and geography) made limited trials of Peer Instruction in their lectures, sometimes using questions developed by the researcher. The researchers then obtained feedback from the lecturers on the efficacy of the method in those units, obtained student feedback where possible, and attempted to analyse the factors contributing to success or failure of the method in different units. A report was written detailing the outcomes of the research, and it has been published on the Peer Instruction in the Humanities web-page:

http://arts.monash.edu.au/philosophy/peer-instruction/evaluations/pith_report.pdf

Student evaluations from the Geography course are included in Appendix A7 below. The results from the student evaluations are consistent with those obtained previously from our trials of the method in philosophy, with a majority of students reporting that Peer Instruction increased their levels of engagement and attention in lectures and helped them to better understand the material being taught.

Overall, the trial of PI in these subjects have shown that Peer Instruction is an extremely adaptable, versatile approach to interactive teaching, readily adaptable to different academic disciplines. We found that ConcepTest questions can be used in a number of different ways in lectures, many of which have not previously been noted in the research literature on Peer Instruction. Further details can be found in the above mentioned report.

2.6 Dissemination

We anticipate that the main vehicle for dissemination of the results of this project will be the website. As detailed below, we have advertised the website and drawn PI to the attention of many potential adopters through presentations and subscriber email lists. In addition, we have written an article on using PI in philosophy for submission to a widely read academic journal.

2.6.1 Presentations

AAP Conference

As planned, Sam Butchart and John Bigelow gave a presentation ('Teaching Philosophy using Peer Instruction') at the annual Australasian Association for Philosophy (AAP) conference in Armidale NSW on 2nd July 2007. The AAP conference is the largest international conference for philosophers in the Australasian region and also attracts a large international contingent.

The talk was well attended (about 25-30 people) and generated a lot of interest. The talk included a demonstration of the PI method itself; we asked the audience to vote on the answer to a logic puzzle, then try to convince their neighbour their answer was correct before voting again. There was some convergence on the right answer after the discussion, which gave a good demonstration of the method.

At the end of the presentation, we supplied detailed handouts with additional information, references and examples as well as the URL for the website. All of these were taken away. Quite a few people came to talk to us about PI during the rest of the week at the conference. A copy of the PowerPoint presentation for the talk is available on the project website.

Vice Chancellor's Showcase of Teaching Excellence

Toby Handfield gave two presentations on using Peer Instruction in the humanities at the Vice Chancellor's Showcase of Teaching Excellence, Monash Caulfield, 28th September 2007. See <http://www.monash.edu.au/teaching/vcshowcase/program/>.

2.6.2 Mailing lists

On 17th December we sent out an email advertising the Peer Instruction in the Humanities website to the a-phil email list. This is a subscriber email list for people working in philosophy in Australasia. One recipient then forwarded the email on our behalf to the European philos-l email list. Since then, the email has also been posted on the fa.philos-l usenet discussion group, where one user has already posted a favourable review of the website.

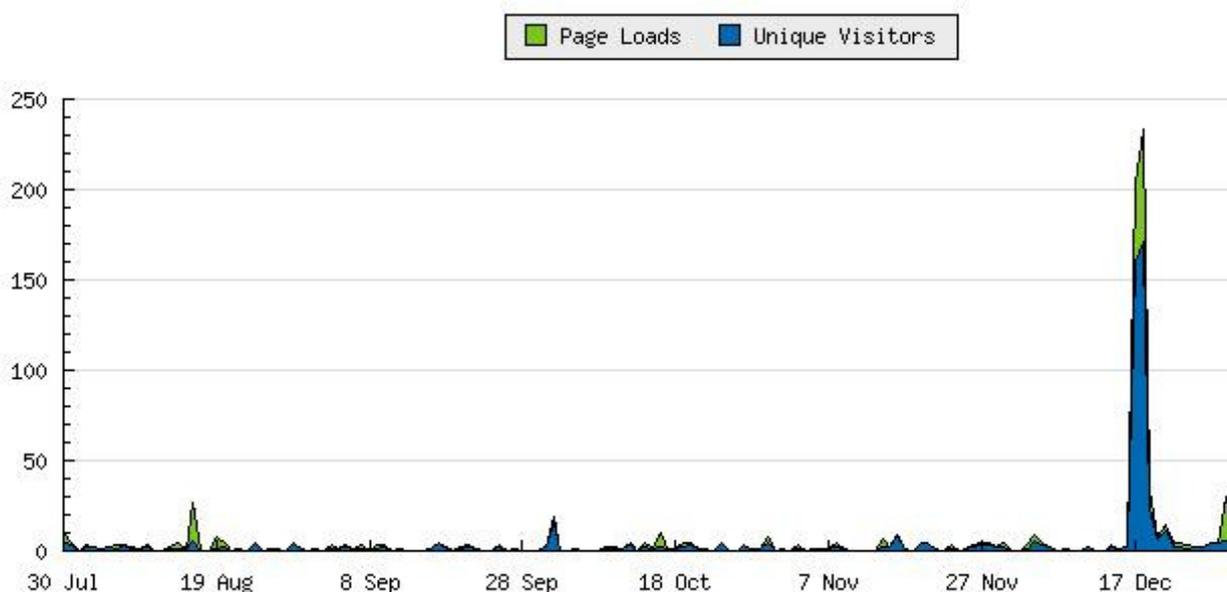
Both lists have a very large subscription (exact figures are not available, but we would estimate 200-300 subscribers to the a-phil list and at least twice that for the philos-l list). The email seems to have generated a great deal of interest. In the two days after the email went out, we received a total of 194 new visitors to the webpage (see the following section). A description of PI along with a reference to our website has also now appeared on an e-learning wiki website at the University of Sydney:

http://wiki.arts.usyd.edu.au/elearning/index.php/Peer_instruction

Advertising the website on these email lists therefore appears to have been a very successful dissemination strategy. As a result, a very large number of potential adopters will now be aware of PI and of the resources and help available on the website.

2.6.3 Website statistics

Since 1st July, when we began logging hits, the website has had 876 page loads coming from 592 unique visitors, with 63 returning visitors. Most of these visits occurred in the days after the email advertising the site was sent out on the a-phil philosophy email list.



Most visitors to the site have been from Australia and the UK, although many other countries are also represented. Here is a summary:

	Num	Perc.	Country Name	
▼	382	46.30%	Australia	
▼	161	19.52%	United Kingdom	
▼	45	5.45%	United States	
▼	40	4.85%	Unknown	-
▼	26	3.15%	Netherlands	
▼	17	2.06%	Germany	
▼	12	1.45%	Ireland	
▼	11	1.33%	Turkey	
▼	11	1.33%	Belgium	
▼	11	1.33%	New Zealand	
▼	11	1.33%	Canada	
▼	8	0.97%	Spain	
▼	7	0.85%	Italy	
▼	7	0.85%	France	
▼	6	0.73%	Finland	
▼	6	0.73%	Philippines	
▼	5	0.61%	Israel	
▼	5	0.61%	Sweden	
▼	5	0.61%	Hong Kong	
▼	4	0.48%	Estonia	
▼	4	0.48%	Singapore	
▼	4	0.48%	China	
▼	3	0.36%	Portugal	
▼	3	0.36%	Iceland	
▼	3	0.36%	Hungary	
▼	2	0.24%	Switzerland	
▼	2	0.24%	Austria	
▼	2	0.24%	India	
▼	2	0.24%	Poland	
▼	2	0.24%	Slovenia	
▼	2	0.24%	Argentina	
▼	2	0.24%	Latvia	
▼	2	0.24%	Czech Republic	
▼	2	0.24%	South Africa	
▼	1	0.12%	Norway	
▼	1	0.12%	Colombia	
▼	1	0.12%	Taiwan	
▼	1	0.12%	Lebanon	
▼	1	0.12%	Mauritius	
▼	1	0.12%	Lithuania	
▼	1	0.12%	Japan	
▼	1	0.12%	Greece	
▼	1	0.12%	Iran, Islamic Republic Of	
▼	1	0.12%	Guyana	

We have been using StatCounter, to log hits on the website. See: <http://www.statcounter.com>.

As of this date, we have not been contacted by lecturers who have adopted PI or received any questions for the database. We anticipate that this will change when teaching begins in the new academic year now that many more potential adopters have been made aware of PI

through the dissemination activities described above.

2.6.4. Reports and articles

Sam Butchart, Toby Handfield and Ian Gold are working on article on PI for the journal *Teaching Philosophy*. The article explains how to use PI in lectures and describes its many advantages. This is followed by a discussion of the many types of question that can be used, along with examples from philosophy, critical thinking and formal logic. Finally, the results from our evaluations of PI are summarised. The article should be ready for submission early in the new year.

A report on the investigation into the use of PI in Geography, Politics, History and Classics has been submitted to Arts faculty and published on the website. See: <http://www.arts.monash.edu.au/philosophy/peer-instruction/evaluations/>

3. Conclusions

The project has been a great success and achieved its main aims. We have shown that Peer Instruction can be used in the humanities as effectively as it is in the sciences. We have successfully used PI in a variety of undergraduate philosophy courses and shown that it also has potential in subjects such as history, geography and classics. Our evaluations have consistently shown that students respond very positively to the use of PI in their lectures and find it helps them with attention and comprehension. It also makes lectures much more enjoyable for both students and lecturer. We do not yet have reliable data on the effectiveness of PI in terms of learning outcomes such as exam results, although the data we do have is at least encouraging. Hopefully as more people adopt PI in the humanities, more work on this area will be done. At Monash, we will certainly continue to use PI in our teaching and hope to carry out more work on evaluating its effectiveness in the future.

Through this project, we have helped lecturers outside the Monash philosophy department to use PI successfully in their lectures (in formal logic at the University of Melbourne and in history, classics and geography at Monash). By advertising the project and the website through presentations and postings to email lists we have begun the process of making PI much more widely known and used in the humanities.

The *Peer Instruction in the Humanities* website has been set up as planned and is now starting to get a significant number of visitors. It seems likely that the information, resources and ready to use ConcepTest questions available on the website will encourage and assist lecturers wishing to use PI in their lectures. We anticipate that a large number of people will learn about the potential of PI through the website. In the future, we hope that it will grow to serve as a central focus for lecturers to share and exchange information and resources on using Peer Instruction in the Humanities.

Appendix: Evaluations of PI

A1. Critical Thinking 2006

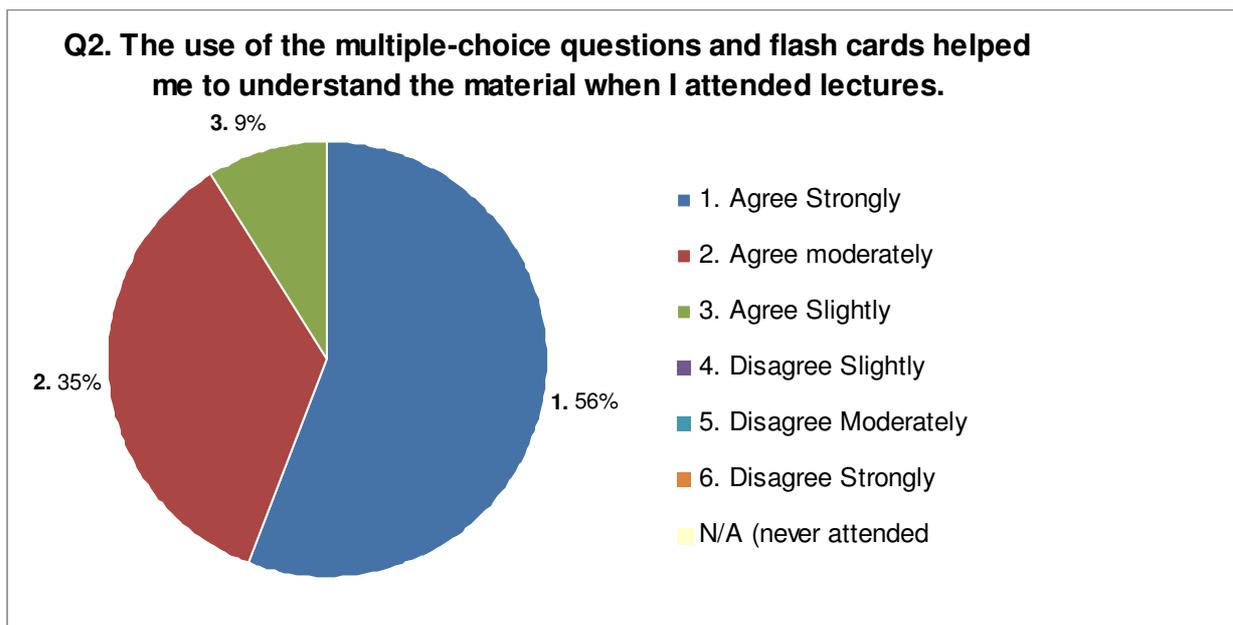
PHL1030: *Thinking: Analysing Arguments*. Monash University, School of Philosophy and Bioethics. Semester 1, 2006.

Description

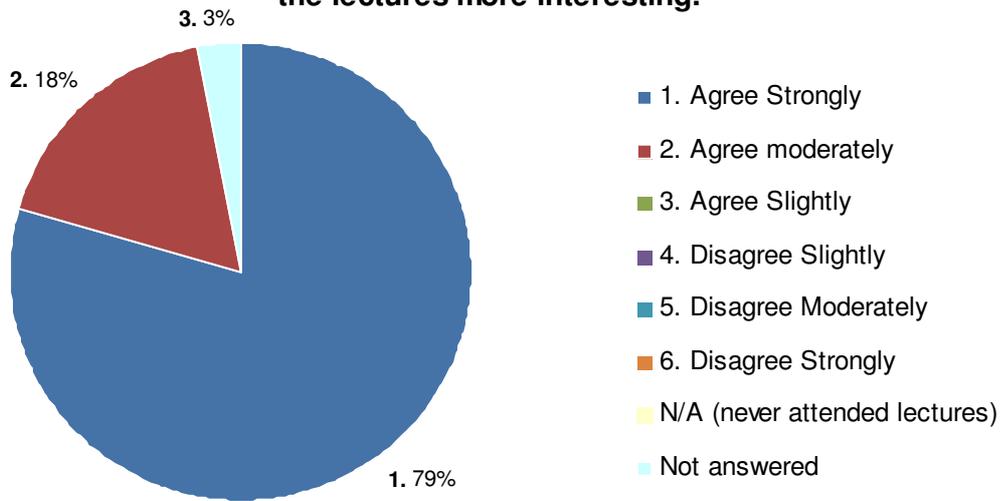
Approximately 4-6 questions were used in each one-hour lecture. 34 students completed the questionnaire. This represents 56% of the total enrolment of 61. However, given that typically about 25-30 students attended lectures, it is likely that this figure represents nearly all students who attended lectures.

Summary

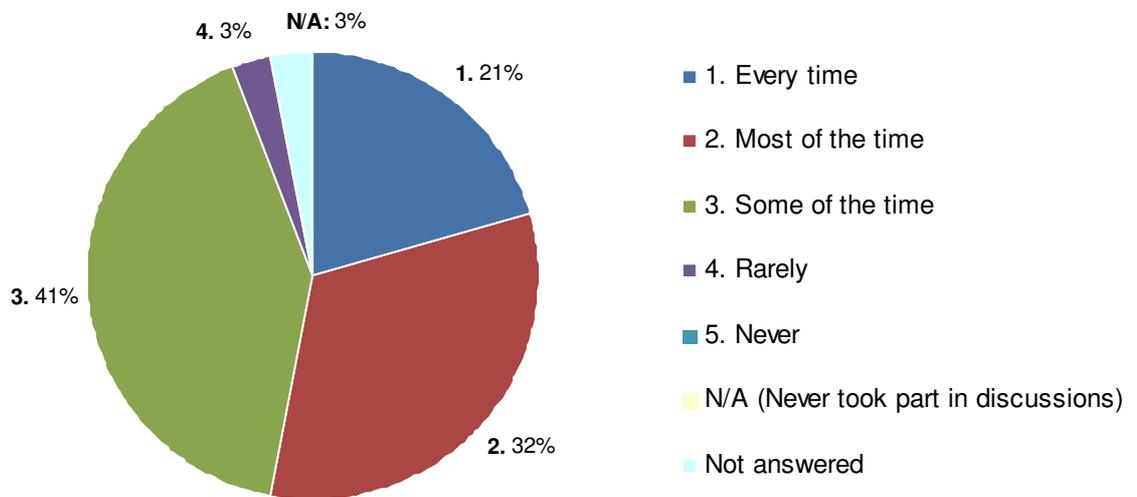
Below are the results from four key questions on the questionnaire.



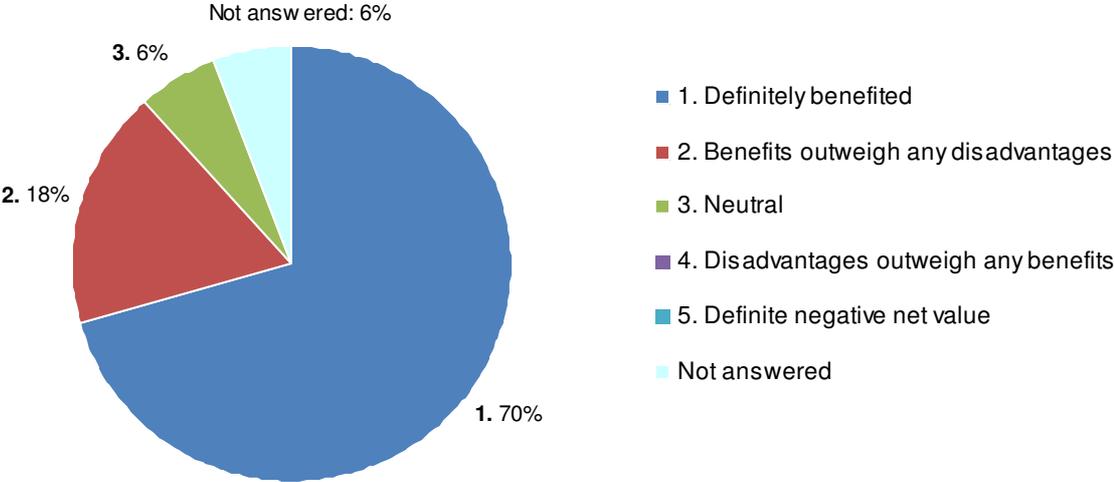
Q4. The use of the multiple-choice questions and flash-cards made the lectures more interesting.



Q6. The discussions with fellow students helped to improve my understanding of the topic



Q12. What (for you) was the balance of benefit vs. disadvantage from the use of the multiple-choice questions and flash cards in the lectures?



Sample comments

Benefits

Q10. What were the benefits (for you) of the multiple-choice questions and flash-cards (if any)?

Improved understanding (9 comments)

They consolidated the content of the lecture and helped build confidence that the things I was taking from the lecture were the right ones. ... They should be done in more classes.

They were a good way to reinforce the theory we were learning in the lectures. I wanted to do more of the multiple choice questions I felt they helped me understand the course material and gave me an opportunity to practice my critical thinking skills.

They helped to ensure that I understood the concepts being taught and could put them into practice.

They made me think about the question properly, and come up with an answer. I had to utilise the stuff that was being taught immediately, rather than simply remembering it and trying to use it later on when I've forgotten half of it. It definitely helps with remembrance, and ability to use the skills being taught.

Interaction and engagement (9/24 comments)

I enjoyed the interactiveness that they brought to the lectures and the general discussion that usually ensued for the trickier questions....

It made lectures interactive and also gave me an opportunity to demonstrate if I had or hadn't grasped the material just taught and then if so, to clarify them ... they're fun and interesting!

Made the lecture much more interesting than most of the other lectures I've been to.

I enjoyed being able to test my knowledge and ability to apply that knowledge right there in the lecture. It also broke up the lecture and gave us something to actively do instead of just passively listening and taking in the information. ... I wish more lecturers would use this method - well done!

Useful feedback (7/24 comments)

Cleared up misunderstandings. Sometimes I thought I understood and the flash cards showed that I hadn't...

Allowed me to see how I was doing in comparison with others in the class. I was not put down by being wrong, because I could see that at least I was not the only one who answered in a particular way. Also allowed the lecturer to address where and why people went wrong in their reasoning without singling out individuals.

... gave me an opportunity to demonstrate if I had or hadn't grasped the material just taught and then if so, to clarify them ...

...It also made me feel less stupid when I knew I wasn't the only one with the wrong answer.*

Improved attention (5/24 comments)

Made me more alert during lectures. Helped sustain my attention and interest during the lecture. ... Good, innovative approach.

They kept my attention in lectures and also allowed me to associate certain principles with examples.

Broke up lectures a bit, kept me alert and focusing on the material.

Disadvantages or problems

Q11. What were the disadvantages (for you) of the multiple-choice questions and flash-cards (if any)?

No disadvantages (10/19 comments)

I found no disadvantages.

None.

There were none, it was great, we should have that for every class

None really. If I wasn't sure of the answer I just abstained. Anyone uncomfortable with voting in front of everyone else could do the same, I suppose.

Too easy to vote with the majority (4/19 comments)

Very easy to vote according to how the rest of the class votes.

I reckon some people voted deliberately in conformity with the rest, which is a disadvantage of being able to see what everyone else is voting for.

Not enough time given to think (2/19 comments)

I was not given enough time to think about the answer. Because of this, I ended up voting with the majority of people because I was unable to answer the question myself in the time given.

Sometimes too quick.

Embarrassed if answered incorrectly (1/19 comment)

Sometimes if I was unsure of an answer it was embarrassing holding up the flash cards when others could see my answer, especially if I got it wrong!

Not as effective when listening to recordings (1/19 comment)

I listen online and they are not as effective this way.

Too many questions (1/19 comment)

Sometimes when we did 5 or 6 in a row I lost interest. But I am a bit of a short attention student.

Other comments

Positive (18/18 comments)

The cards help you understand the material because they force you to actually work out the answer. It's too easy to sit and watch a lecturer tell you the answer when you might not really be paying much attention, but if you're forced to participate then you have motivation to get it right.

They're great! They are also good because they highlight times when a particular part of a concept hasn't been fully explained (or where people have misinterpreted the lecturer). I wish more lecturers would use this method - well done!

Multiple choice questions throughout the lecture were very good in terms of practically using and understanding what he had just learnt about and consolidated my learning. I also think that they make [the lecturer] feel good about his teaching because it always seems like most people are paying attention and learning stuff! Flash cards are fun!

they were awesome!!!!!!!!!!!!!!

All lecturers should try incorporate them into their lectures. Its a great idea and kept us active during the lecture. Would definitely help with the 'boring' factor a LOT of other lectures have.

They're fun and interesting!

The use of flash cards deals with what I believe would be one of the biggest hurdles for lecturers, to overcome the apathy of students to volunteer to give responses. Students have a tendency to not participate if they are singled out to give a response, but with everybody responding simultaneously, it creates a more dynamic and engaged studying environment. I hope it continues to be used, perhaps it will spread to the other subjects, and perhaps eventually they will build electronic multiple choice buttons built into the chairs :) .

More lecturers should use them. Keep it up.

They are good. It was really good how we gave our initial answer and then tried to 'sell it' to each other and then revote.

Good, innovative approach.

Neutral (0/18 comments)

Negative (0/18 comments)

A2. Critical Thinking 2007

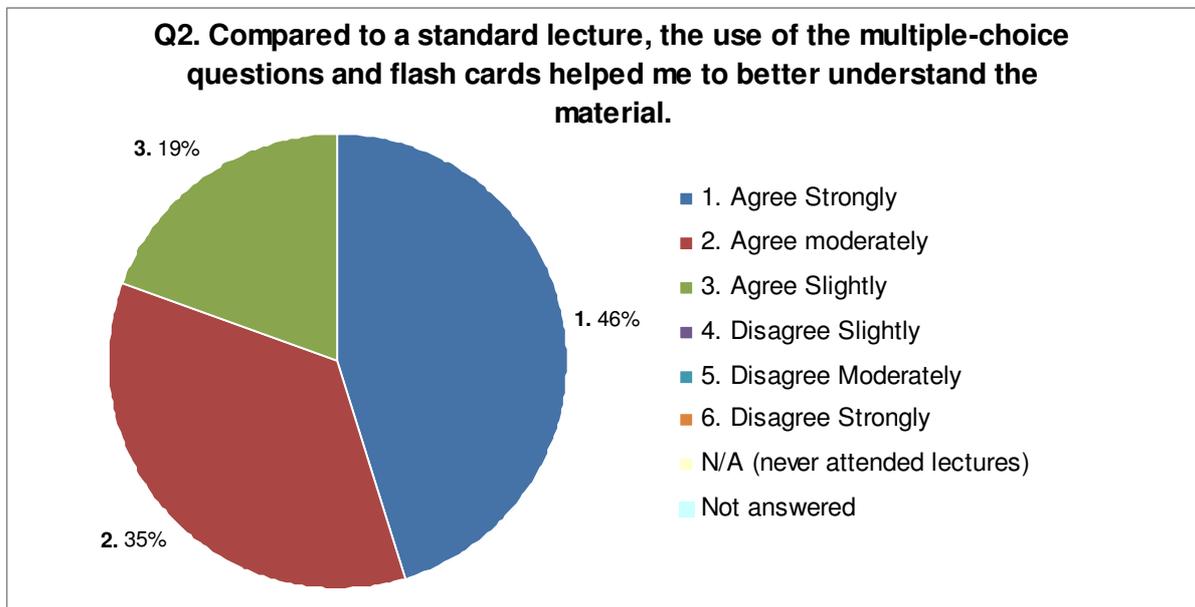
PHL1030/2030: *Thinking: Analysing Arguments*. Monash University, School of Philosophy and Bioethics. Semester 2, 2007.

Description

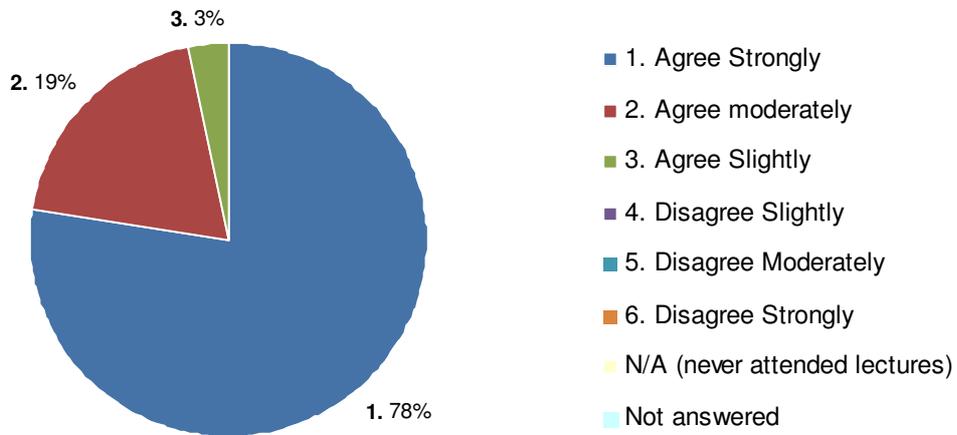
Peer Instruction was used in the lectures for a first and second year critical thinking course, *Thinking: Analyzing Arguments*. Approximately 3-4 questions were used per lecture. 31 students completed the questionnaire, representing 42% of the total enrolment of 73.

Summary

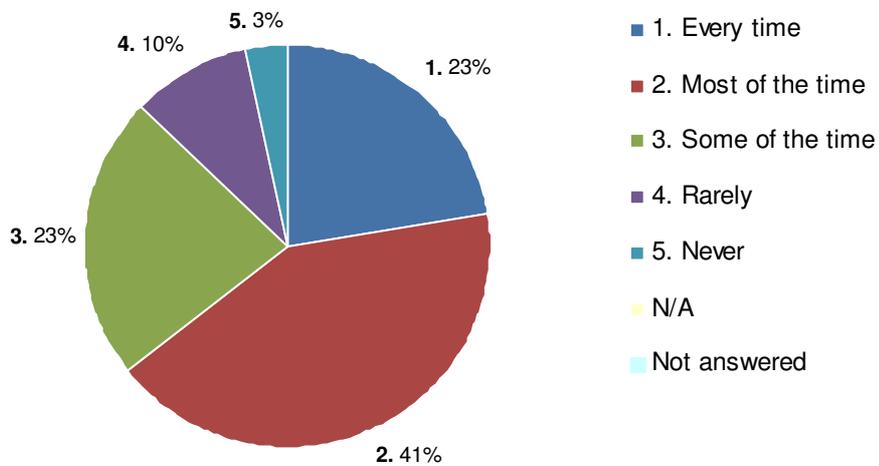
Below are the results from five key questions on the questionnaire.



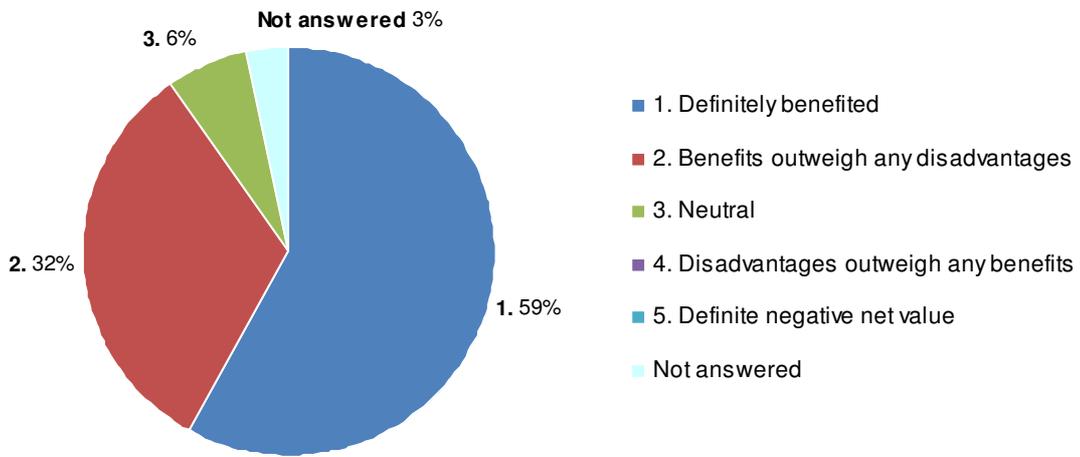
Q4. Compared to a standard lecture, the use of the multiple-choice questions and flash-cards made the lectures more interesting.



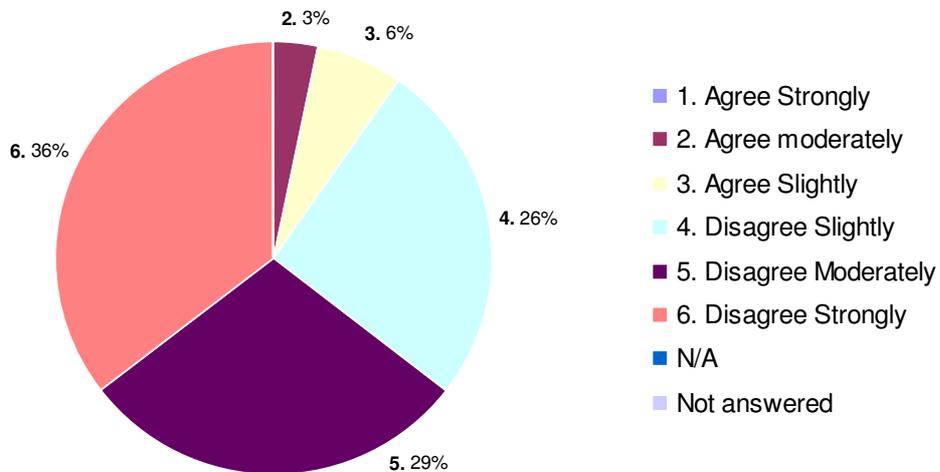
Q6. The discussions with fellow students helped to improve my understanding of the topic



Q12. What (for you) was the balance of benefit vs. disadvantage from the use of the multiple-choice questions and flash cards in the lectures?



Q15. The time taken up in lectures with quiz questions and discussions would be just as well (or better) spent if the lecturer taught the material in the usual way.



Sample comments

Benefits

Interaction and engagement (12/25 comments)

More active participation in class stimulated further analysis of issues.

Able to participate more in lectures.

Helped engage with course material and forced to think about it :)

Kept lecture interesting.

Chance to discuss with others. Chance to think thoroughly.

Helped me think about the material more carefully and forced me to engage with the lecture more.

Improved attention (7/25 comments)

Broke up the lecture a bit, kept me alert.

Helped me stay focused in lecture.

It breaks up the lecture so that students don't get bored.

Useful feedback (5/23 comments)

Helped me realize if what I was thinking was wrong.

Gave me time during class to apply what I had learned. It helped me to see if I understood the information.

Helped me to see if I was on the right track.

Help me pay attention (for fear of being wrong! :)) and help me determine which ideas I need to work on more to understand.

Improved understanding (5/23 comments)

Helped me understand the topics better and discuss them when I was wrong.

Allowed understanding of lecture content. A good application of theory just learnt.

Allowed me to really consider the question and discuss with others how to answer it which assisted my learning.

Disadvantages or problems

No disadvantages (6/15 comments)

None.

N/A.

Not enough time given to think (2/15 comments)

Sometimes not provided with enough time to think about questions before answering them.

That I did not have enough time to think about questions.

Embarrassed when answered incorrectly (2/15 comments)

Stress that you would get the question wrong

Embarrassment when I got the answer wrong.

Questions too long or too hard (1/15 comments)

Long multiple-choice questions sometimes are confusing and take time to comprehend the meaning since English isn't my 1st language.

Takes up time (1/15 comments)

Sometimes took too long. [Sometimes the answer wasn't clearly explained.]

Discussions with peers not useful (1/15 comments)

Trying to justify my answer through conversation, which I'm bad at.

Other (3/15 comments)

Sometimes led to discussions which strayed from the main point.

... Sometimes the answer wasn't clearly explained.

Multiple choice answers sometimes are easier to answer so I may feel like I understand the material even though I don't completely.

Other comments

Positive (8/9 comments)

It's the first course I've taken where we use them and I really like them.

Personally it helped the material stick with me better.

I love the Flashcards! I will use them when I have a class of my own!

Brilliant idea. I'm from BusEco and I think this idea should be expanded to all other faculties. Both innovative and helpful to the students.

Really good idea for this sort of material. Love 'em.

Neutral (0 comments)

Negative (1 comment)

They do involve a lot of dead/waiting time, but I like them.

A3. Formal Logic 2007

161-115 Logic, University of Melbourne, Semester 1, 2007.

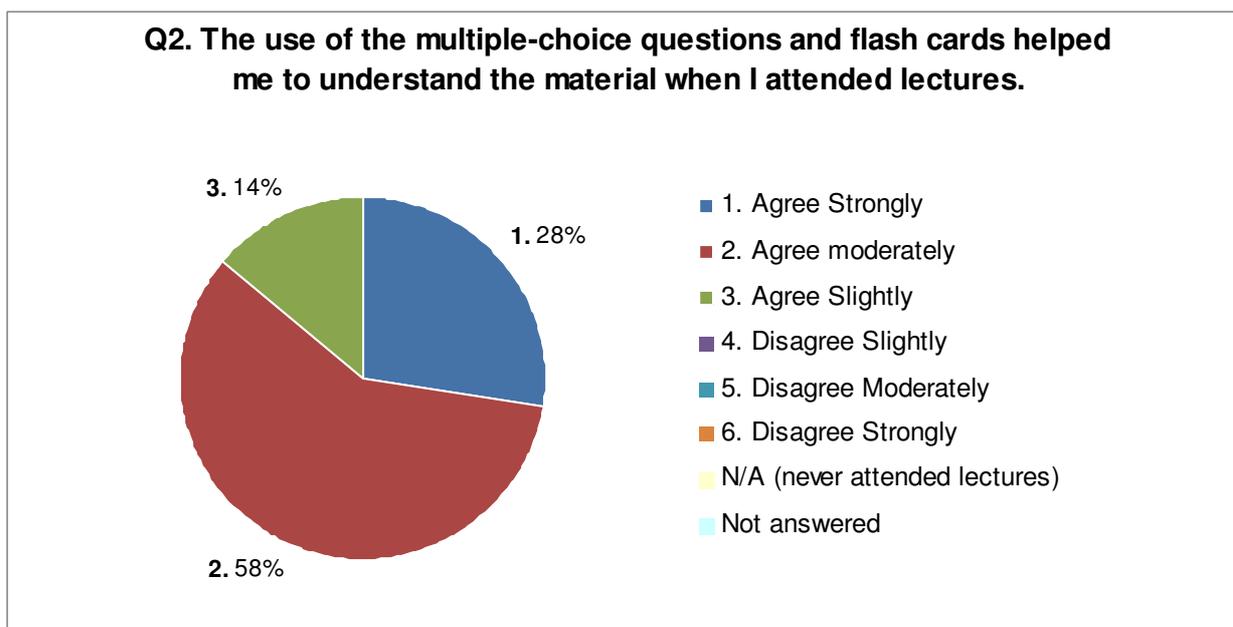
Description

Peer Instruction was used in *Logic*, a first year formal logic course at the University of Melbourne. 2-6 questions were used in each lecture. 29 students completed the questionnaire, representing 50% of the total enrolment of 58.

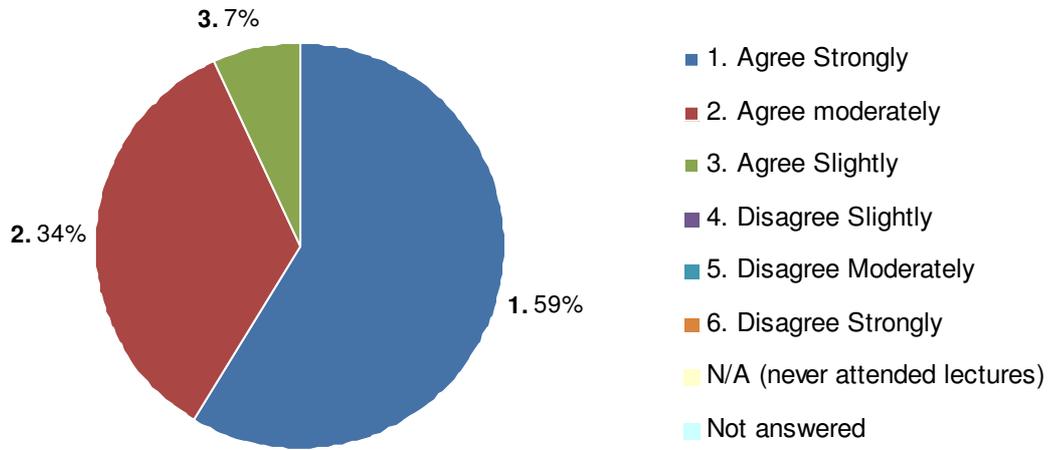
Summary

Below are the results from four key questions on the questionnaire.

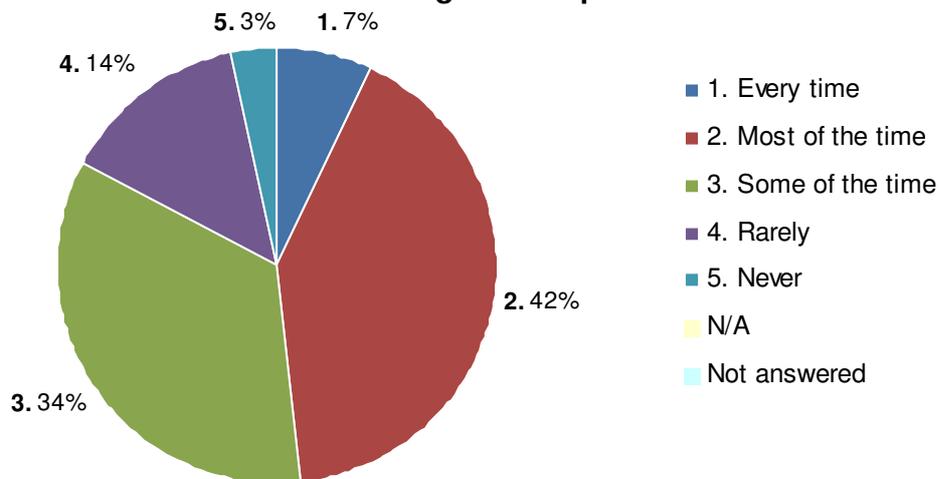
Response rate: 29/58 students (50%)

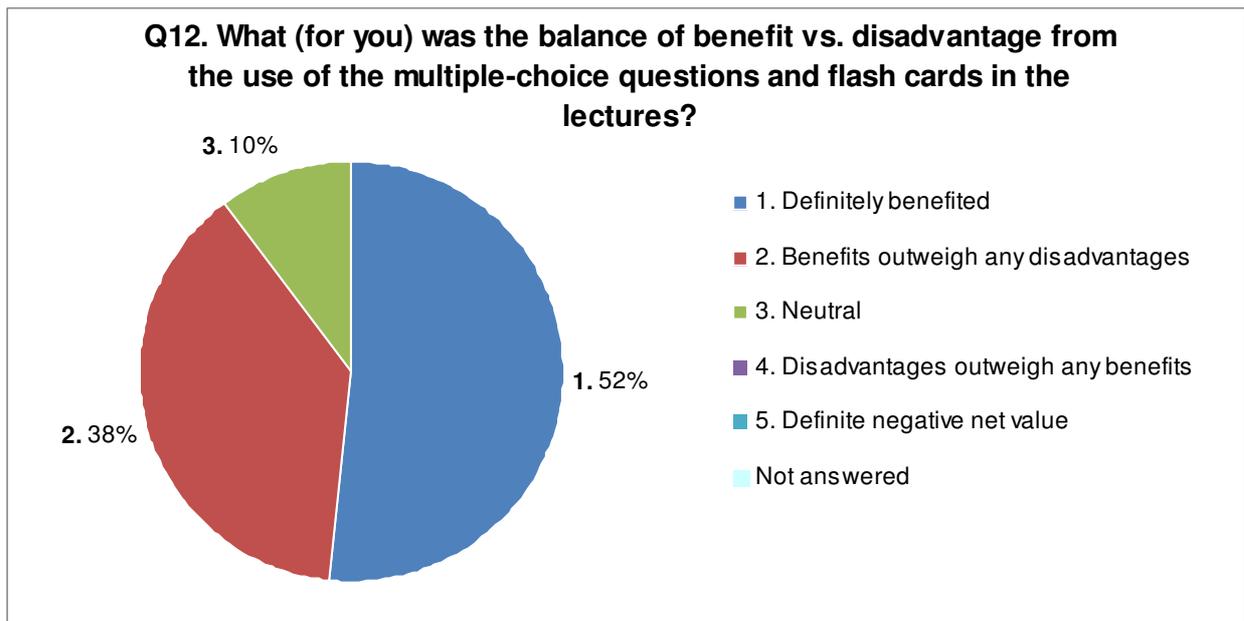


Q4. The use of the multiple-choice questions and flash-cards made the lectures more interesting.



Q6. The discussions with fellow students helped to improve my understanding of the topic





Sample comments

Benefits

Improved understanding

- I got to defend my position which helped me understand it better - ala J. S. Mill
- Made things more interesting and intellectually stimulating; When I got something wrong, and the right answer was explained, it helped my understanding.
- Talking to students re. the question - I often found they explain things really well ;-)
- Getting instant assessment for my answers which, when answers were explained, helped me understand things better. Also helped me to understand/made clear the things I was having trouble with.

Improved attention

- It woke me up and got me thinking and wondering why I was wrong! Made me pay attention more and feel less stupid if I was wrong because other people usually were too.
- Broke up the monotony of the lectures; it was interesting to get involved
- Good idea, the interactivity made the lectures much more engaging and stopped me from drifting off.

Useful feedback

- Helped to gauge how well I had understood the topic. Also indicated my progress compared to the rest of the class.
- Helped me gauge my understanding of the topic (if I had paid attention).

Interaction and engagement

- Keeps you interested; Makes you participate
- It makes the lecture more interactive and thus more interesting and impressive
- Forced me to engage with the material
- The flash cards allow students to participate in the lectures much more than verbal question and responses, which are hard to respond to due to the indirectness of the questions; people hesitate to respond.

Disadvantages or problems

None

- None
- Can't think of any ...
- No disadvantages

Takes up time

- Maybe takes quite a bit of time
- Took a little too long to get through some work.
- I felt that the lectures had a slow pace when we used this system, but we didn't actually miss out on any material ...

Not enough time to think about answers

- Sometimes I needed more time to work out the answer (rarely).
- Partly that there was so little time to think about the questions, especially in questions related to trees.
- Sometimes not enough time was given to think about or compute the answer before voting was required.

Discussions not always useful (1 comment)

- Sometimes I felt that speaking to my peers wasn't of much benefit as both parties were unsure. Thus, however, was not always the case.

Other

- Sometimes it seems quite repetitive and redundant; it could have been really detrimental if the material was not included in the audio lectures
- Sometimes we jumped ahead and did questions without hearing a lecture on the subject.

Other comments

Positive (11/13 comments)

- It's awesome!
- Keep it up :-)
- They should be used in teaching in many other faculties
- I think it is a really good idea and an interesting catalyst for class discussion.
- Good idea, the interactivity made the lectures much more engaging and stopped me from drifting off.

Neutral (1/13 comments)

- The cards were nice and shiny. [...]

Negative (1/13 comment)

- Not very efficient

A4. Ethics 2007

PHL1010: *Life, Death and Morality*, Semester 1, 2007

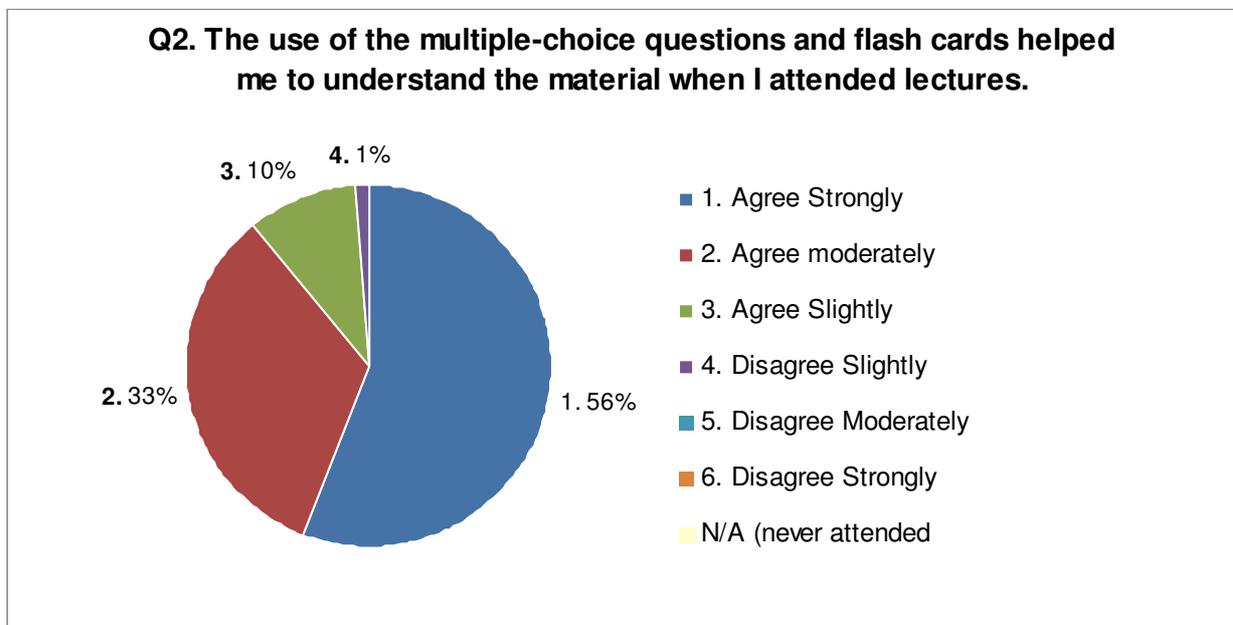
Description

Peer Instruction was used in the lectures for a first year introductory ethics course, *Life, Death and Morality*. Approximately 2-4 questions were used per lecture. 84 students completed the questionnaire, representing 43% of the total enrolment of 195.

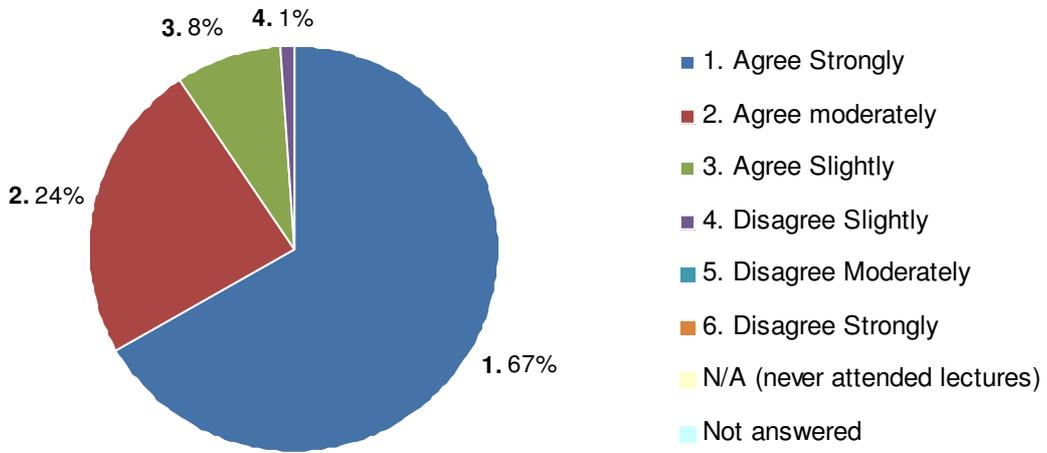
Summary

Below are the results from four key questions on the questionnaire.

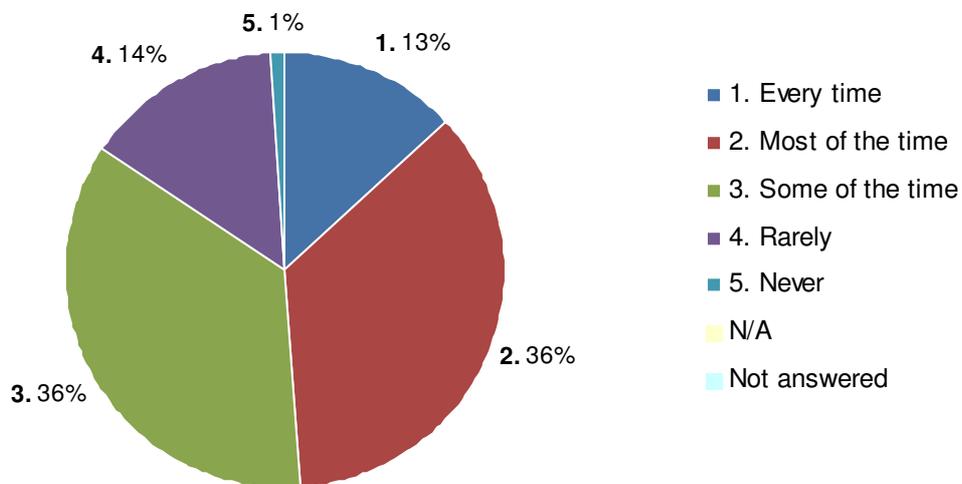
Response rate: 84 students (43%).

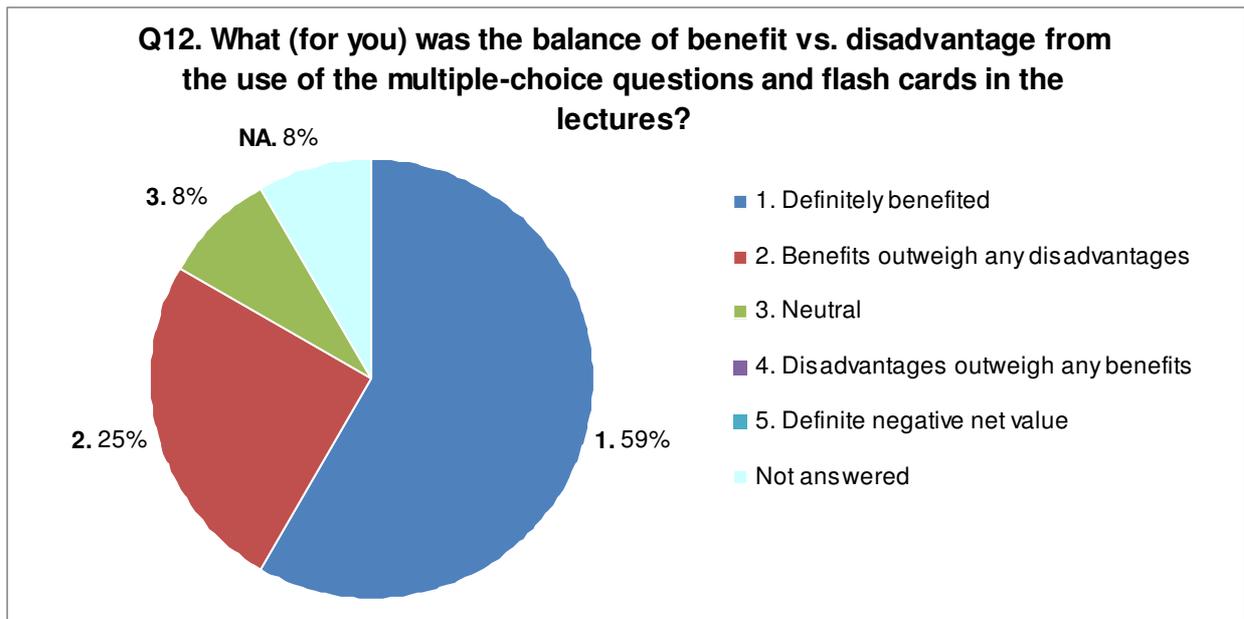


Q4. The use of the multiple-choice questions and flash-cards made the lectures more interesting.



Q6. The discussions with fellow students helped to improve my understanding of the topic





Sample comments

Benefits

Improved understanding

- the discussion and back and forth really solidified my understanding of topics and theories
- I was able to either consolidate my knowledge by discussing with a friend, or was taught by a friend why my answer was wrong and what the right one was - something a lecturer doesn't always have time to do.

Improved attention

- makes you think instead of drift off, and checks that you have the right idea about the concepts.
- It gave the lecture a short break so that we could concentrate better, as well as being interactive meant that you had to pay attention and follow the lecture.

Useful feedback

- let me know if I was on the right track and understanding the topic or not
- They made the lectures far more engaging and they helped me to discover whether I had actually understood (or just thought I'd understood) what the lecture was talking about.

Interaction and engagement

- It made the lectures more interesting and interactive. The primary advantage being that I could argue a point with other students. Partly because of this I found philosophy lectures far more engaging and memorable than my other lectures.
- Had me more engaged with the lecture. Provided a challenge and so enabled me to try to understand the materials so as to have the right answers.

- It made things a lot more interesting. Kept me engaged.

Disadvantages or problems

Not enough time given to think

- Sometimes there was not enough time to think.
- with long questions, sometimes not enough time to think and give an answer.
- the questions often were worded in a way that required some thought to establish what they were asking. so sometimes there wasn't enough time to decide on the correct response

Too easy to vote with the majority

- If I didn't know the answer I would just put up the card, from what I could see, the majority had put up.

Discussions with peers not useful

- I did not find the discussion part with the person sitting next to you very effective, because usually neither had a real logical reason to back up their answer, and this could lead us in the wrong direction..

Embarrassed when answered incorrectly

- Sometimes felt a bit confronted by obvious lack of knowledge ! The format of getting every one to hold up their cards felt like a bit of a test / competition. Perhaps if you had the option of not using the cards it would alleviate the perceived "pressure to perform" (?)
- Bright colours made me hesitant to answer when I realised my answer was different from others.

Other

- Difficult to digest why an answer was wrong or right
- can introduce confusion that did not exist before the questions was presented (when question was obscure)
- Time consuming
- Sometimes it generated a response from the students that distracted from the lecture topic.

No disadvantages

- None.
- None that were obvious. I think they are great; the lectures are interactive, and they give a chance for us to think objectively.
- None really
- No disadvantages.

Other comments

Positive (14/21 comments)

- The flash-cards are good because they allow us to communicate with the lecturer more. Sometimes in lectures in other subjects I feel as if I am just having a speech thrown at me and cannot contribute in any way, whereas the cards make me feel as if I am benefiting more from lectures because I contribute and learn more.
- Very innovative teaching method. I would have liked to have had more time for discussion before and after the questions .
- Overall I think the flash cards were great!
- I liked them!
- They are great :)
- The discussions were really beneficial, and the relaxed approach to the lecture allows us to think and feel confident in asking questions.

Neutral (6/21 comments)

- Instead of having to discuss the multi choice questions with a person next to us PERHAPS (this is only a suggestion) it would be beneficial if the class was open to discuss their own views voluntarily on why they decided on the answer they chose and thus tried to sway others in order to establish a majority vote if the responses were mixed.
- There should be more instances of students being asked to justify their answer.
- Perhaps more vague questions that reveal students personal point of view when it comes to certain issues would be interesting (of course students could veto if they felt uncomfortable stating their beliefs)

Negative (1/21 comments)

- Discussion just do not seem effective, and flash card should mainly be used for the benefits of the lecturer to see if students are understanding the concepts. Also, it is not the greatest experience when a lecturer points out you specifically because you got the wrong answer, and can cause a feeling of embarrassment and humiliation.

A5. God and Religion 2007.

PHL1010: *God, Freedom and Evil* (Philosophy of Religion), Semester 1, 2007.

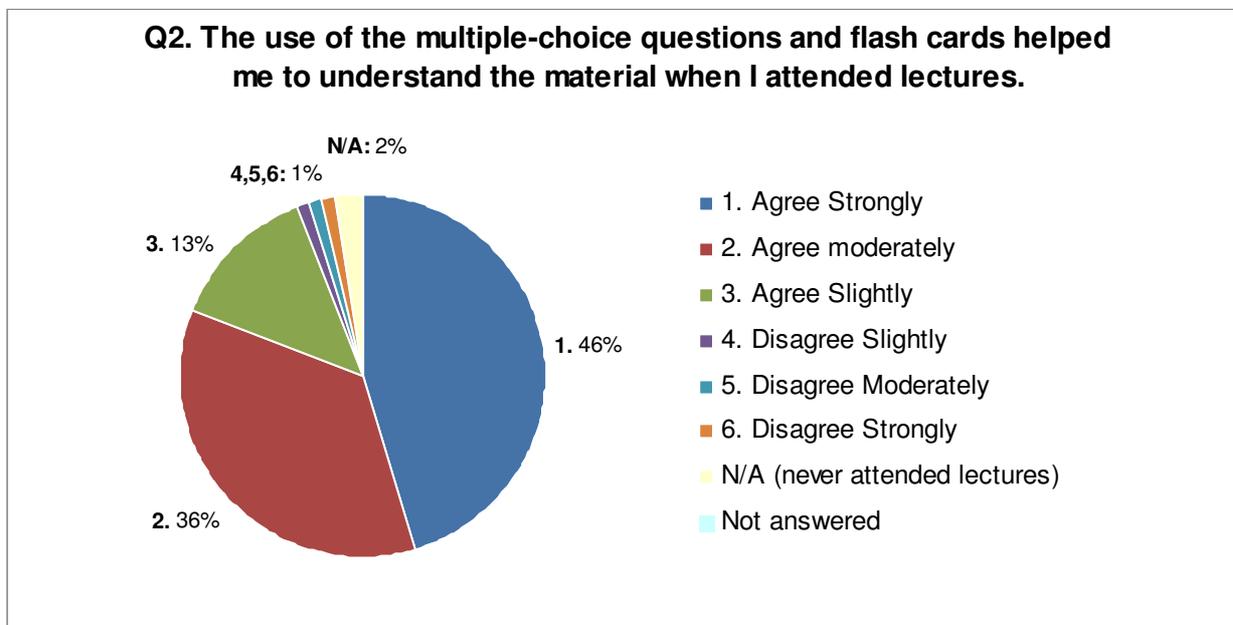
Description

Peer Instruction was used in the lectures for a first year introductory philosophy of religion course, *God, Freedom and Evil*. Approximately 3-5 questions were used per lecture. 84 students completed the questionnaire, representing 43% of the total enrolment of 195.

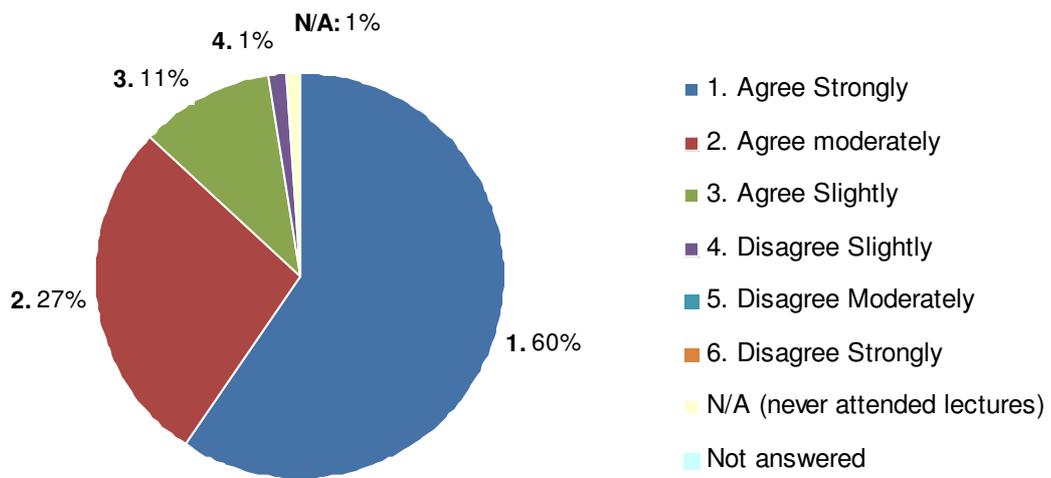
Summary

Below are the results from four key questions on the questionnaire.

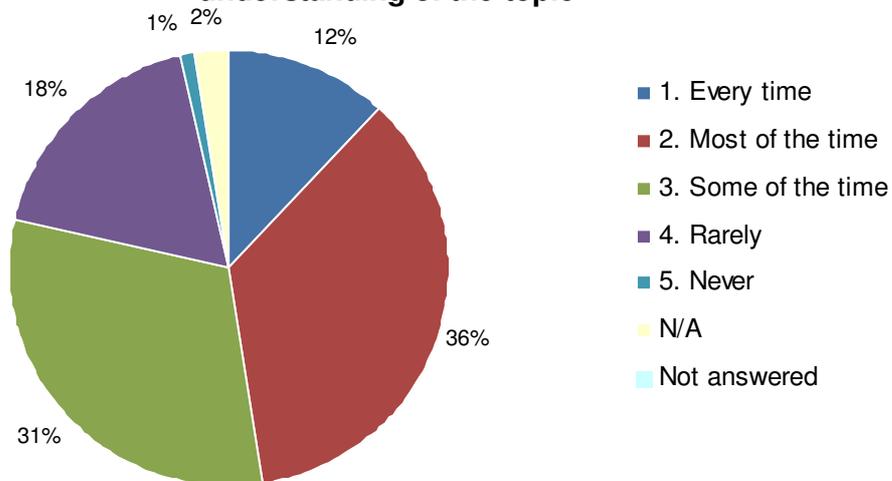
Response rate: 84 students (43%)

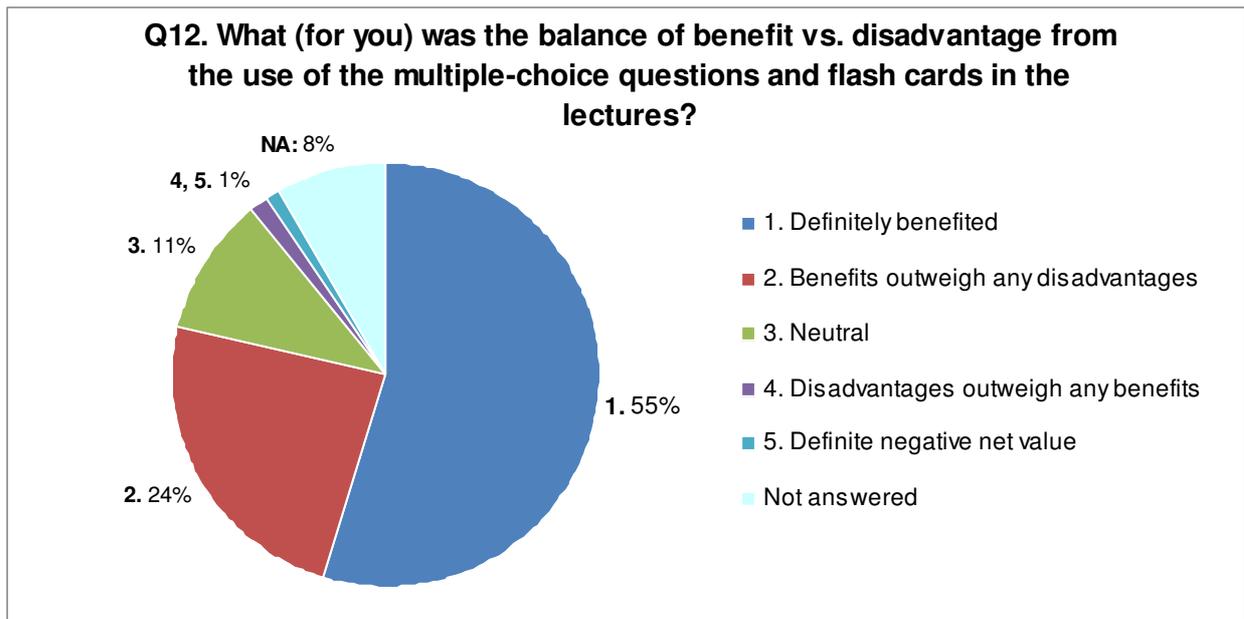


Q4. The use of the multiple-choice questions and flash-cards made the lectures more interesting.



Q6. The discussions with fellow students helped to improve my understanding of the topic





Sample comments

Advantages

Improved understanding

- the discussion and back and forth really solidified my understanding of topics and theories
- I was able to either consolidate my knowledge by discussing with a friend, or was taught by a friend why my answer was wrong and what the right one was - something a lecturer doesn't always have time to do.

Improved attention

- makes you think instead of drift off, and checks that you have the right idea about the concepts.
- It gave the lecture a short break so that we could concentrate better, as well as being interactive meant that you had to pay attention and follow the lecture.

Useful feedback

- let me know if I was on the right track and understanding the topic or not
- They made the lectures far more engaging and they helped me to discover whether I had actually understood (or just thought I'd understood) what the lecture was talking about.

Interaction and engagement

- It made the lectures more interesting and interactive. The primary advantage being that I could argue a point with other students. Partly because of this I found philosophy lectures far more engaging and memorable than my other lectures.
- Had me more engaged with the lecture. Provided a challenge and so enabled me to try to understand the materials so as to have the right answers.

- It made things a lot more interesting. Kept me engaged.

Disadvantages or problems

Not enough time given to think

- GFE: I found it harder than LDM to respond to the questions because I felt sometimes I needed more time to understand the questions and think about the answer.
- GFE: Questions sometimes a bit too complicated to 'work out' in the time provided.
- GFE: There were a couple of times where I felt as if I wasn't given quite enough time to think about the answer, (like during the lecture on decision theory) but on the whole I was given enough time and the cards had me engaged!

Too easy to vote with the majority

- If I didn't know the answer I would just put up the card, from what I could see the majority had put up.

Discussions with peers not useful

- I did not find the discussion part with the person sitting next to you very effective, because usually neither had a real logical reason to back up their answer, and this could lead us in the wrong direction..

Embarrassed when answered incorrectly

- Sometimes felt a bit confronted by obvious lack of knowledge ! The format of getting every one to hold up their cards felt like a bit of a test / competition. Perhaps if you had the option of not using the cards it would alleviate the perceived "pressure to perform" (?)
- Bright colours made me hesitant to answer when I realised my answer was different from others.

Other

- The GFE lectures online sometimes didn't have the lecture material online, so I was unable to follow the questions
- can introduce confusion that did not exist before the questions was presented (when question was obscure)
- Time consuming
- Sometimes it generated a response from the students that distracted from the lecture topic.

No disadvantages

- None.
- None that were obvious. I think they are great; the lectures are interactive, and they give a chance for us to think objectively.
- None really
- No disadvantages.

Other comments

Positive (13/21 comments)

- The flash-cards are good because they allow us to communicate with the lecturer more. Sometimes in lectures in other subjects I feel as if I am just having a speech thrown at me and cannot contribute in any way, whereas the cards make me feel as if I am benefiting more from lectures because I contribute and learn more.
- Very innovative teaching method. I would have liked to have had more time for discussion before and after the questions .
- Overall I think the flash cards were great!
- I liked them!
- They are great :)
- The discussions were really beneficial, and the relaxed approach to the lecture allows us to think and feel confident in asking questions.

Neutral (7/21 comments)

- Instead of having to discuss the multi choice questions with a person next to us PERHAPS (this is only a suggestion) it would be beneficial if the class was open to discuss their own views voluntarily on why they decided on the answer they chose and thus tried to sway others in order to establish a majority vote if the responses were mixed.
- There should be more instances of students being asked to justify their answer.
- GFE: it is useful, but less so with the multiple-choice/flash-card assessment. However, this is in relation to the more content laded thought for GFE - maybe this is only due to the relatively short time spent on each individual topic, after-all, it often feels like we are covering a whole year course in 6 months on top of the LDM studies.

Negative (1/21 comments)

- Discussion just do not seem effective, and flash card should mainly be used for the benefits of the lecturer to see if students are understanding the concepts. Also, it is not the greatest experience when a lecturer points out you specifically because you got the wrong answer, and can cause a feeling of embarrassment and humiliation.

A6. Ancient Philosophy: Plato 2007.

PHL2130: *Plato and Platonism*. Monash University, School of Philosophy and Bioethics. Semester 2, 2007.

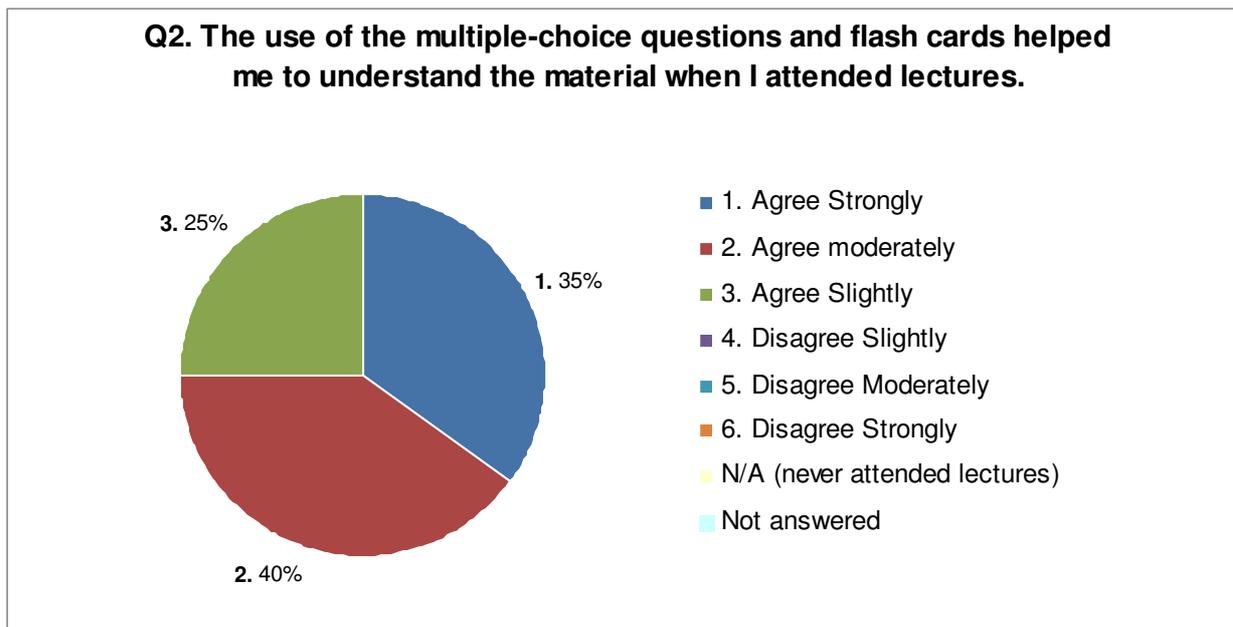
Description

Peer Instruction was used in the lectures for a second year philosophy course, *Plato and Platonism*. Approximately 2-3 questions were used per lecture. 20 students completed the questionnaire, representing 47% of the total enrolment of 43.

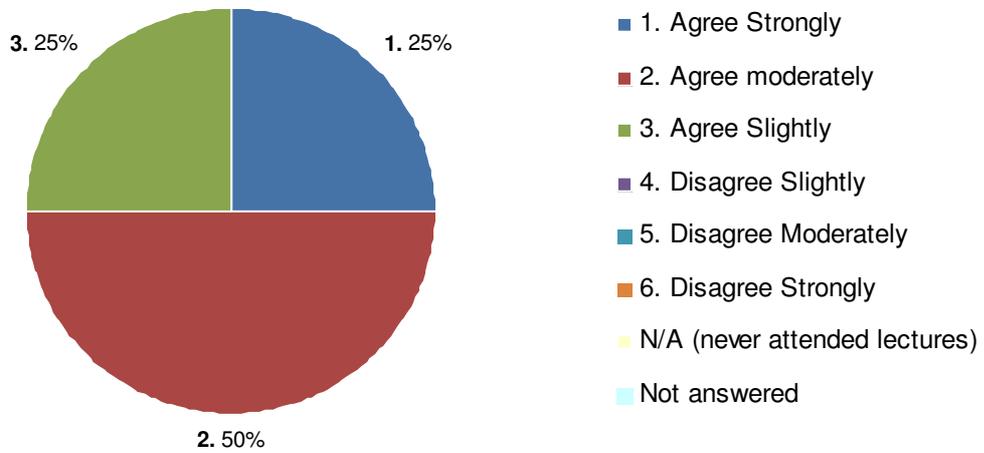
Summary

Below are the results from five key questions on the questionnaire.

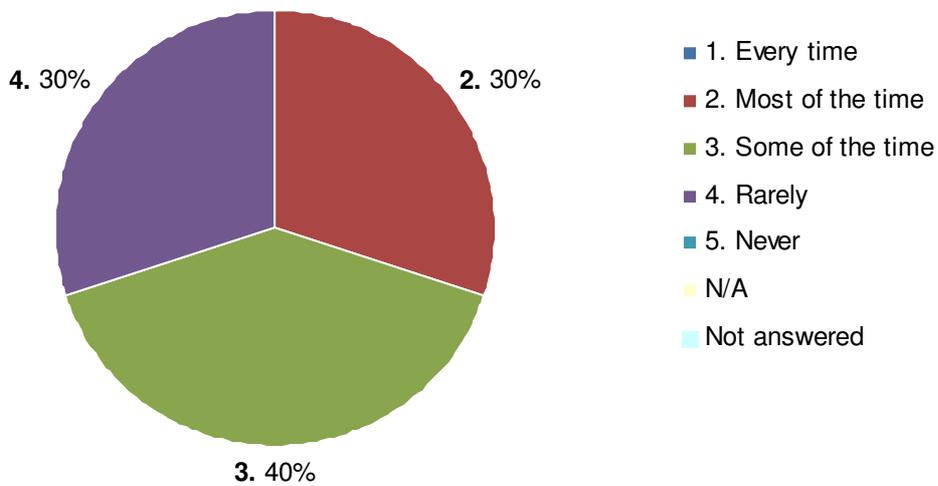
Response rate: 20 students (47%).



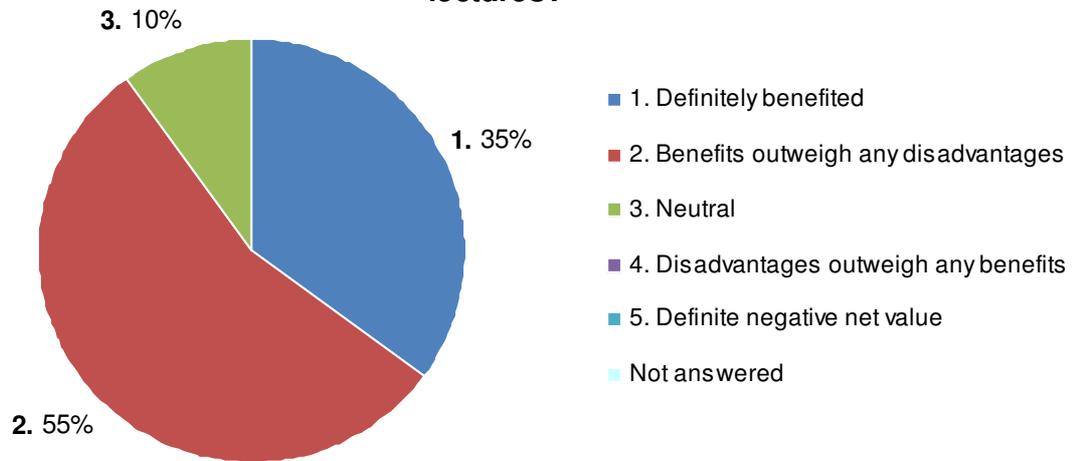
Q4. The use of the multiple-choice questions and flash-cards made the lectures more interesting.



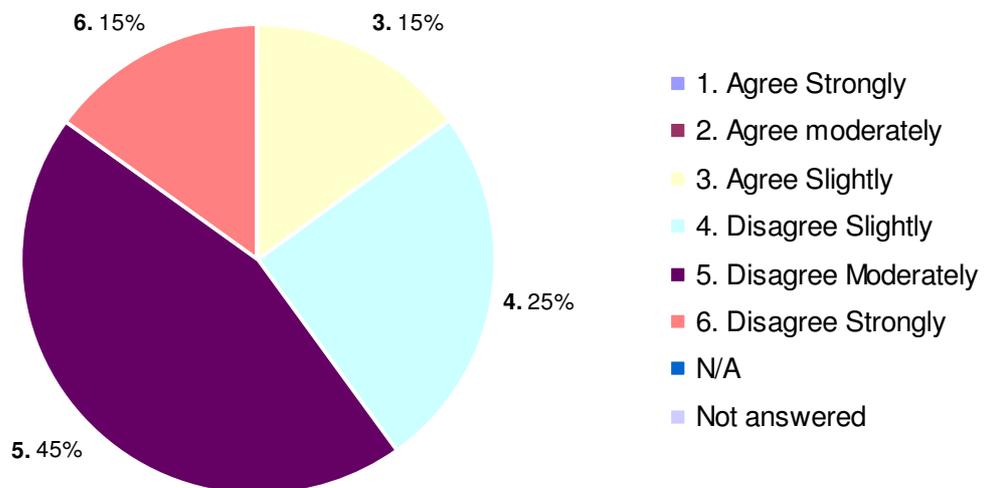
Q6. The discussions with fellow students helped to improve my understanding of the topic



Q12. What (for you) was the balance of benefit vs. disadvantage from the use of the multiple-choice questions and flash cards in the lectures?



Q15. The time taken up in lectures with quiz questions and discussions would be just as well (or better) spent if the lecturer taught the material in the usual way.



Sample comments

Benefits

Interaction and engagement (6/16 comments)

- Engaging with material.
- They were interactive and encouraged me to actively engage with the course material.
- Active involvement in material rather than just sitting and listening.
- Gave opportunity to think about question instead of passively receiving "right" answer.

Improved attention (4/16 comments)

- It made the lectures more interesting and it helped break up lectures into reasonable sections.
- They made the lecture more interesting. It kept me focused and helped me to think about the lecture material instead of just letting it wash over me.

Improved understanding (3/16 comments)

- Broke up the lecture and gave us a chance to properly understand the material in the lecture.
- Ability to engage with the material, particularly as a multiple choice question usually identifies common misconceptions.
- Reinforcement of points in lecture. Opportunity to formulate own ideas on topic before given the answer by lecturer.

Useful feedback (3/16 comments)

- Able to gauge for myself how much I understood content and whether there was anything I was lacking.
- Get to see if others are as clueless as me, there's a certain amount of comfort in that.

Disadvantages or problems

No disadvantages (3/14 comments)

- None.
- None, good idea.

Questions too long or too hard (3/14 comments)

- Questions sometimes take a greater amount of time to understand.
- Sometimes the questions were long, making it a bit hard to grasp quickly.

Not enough time given to think (2/14 comments)

- Lack of time to think about the questions properly sometimes.
- Only think I needed more time to think about the options.

Takes up time (2/14 comments)

- Too little time, felt rushed and it took time away from lecture.
- Took some time to get info to sink in so I could answer the question.

Discussions with peers not useful (1/14 comments)

- I didn't like the discussion that much. I found most students, myself included, didn't know the material well enough to properly justify our answers.

Embarrassed when answered incorrectly (1/14 comments)

- Might be self conscious if I didn't know the answer.

Other comments

Positive (3/7 comments)

- Very suitable teaching method for philosophy.
- Useful b/c it made me tune in, broke monotony of lecture.
- I think they help keep interest during the lecture. And for me they woke me up during sometimes boring lectures.

Neutral (3/7 comments)

- With longer lectures, it would allow for more thinking time.
- They go ok.
- Being given a copy of the questions and answers would have been helpful. Perhaps on a separate sheet at the end of the lecture.

Negative (1/7 comments)

- Most questions were good but some I thought was unnecessary (when most people got the answers right)

A7. Geography 2007

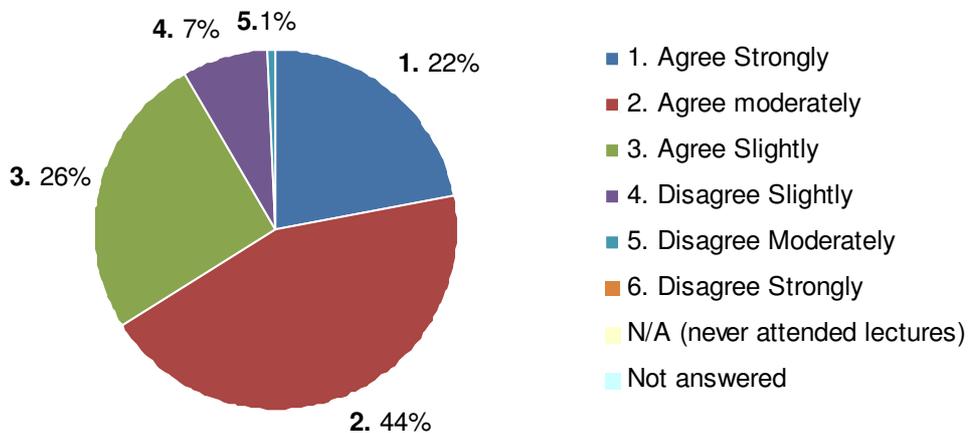
GES1070: Extremes: Natural hazards and human vulnerability, Monash University, Semester 1, 2007

Summary

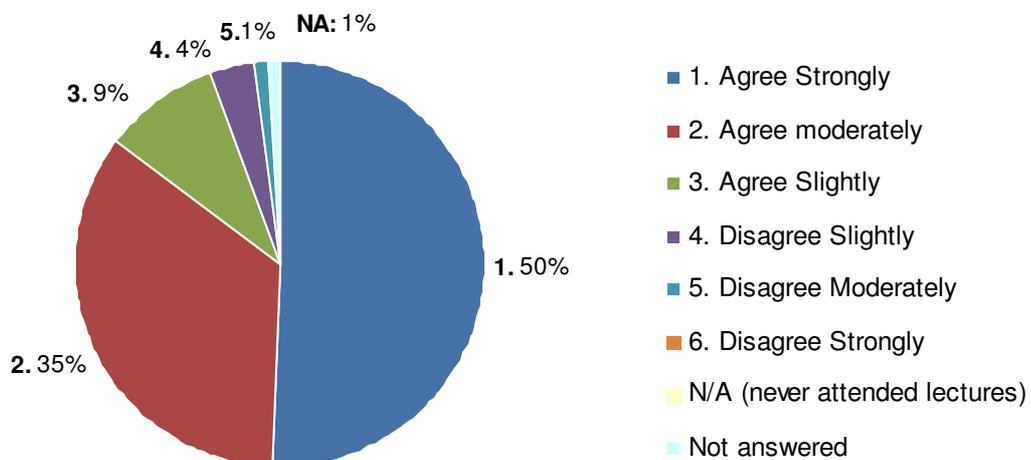
Below are the results from four key questions on the questionnaire.

Response rate: 109 students (approx. 45% of total enrollment)

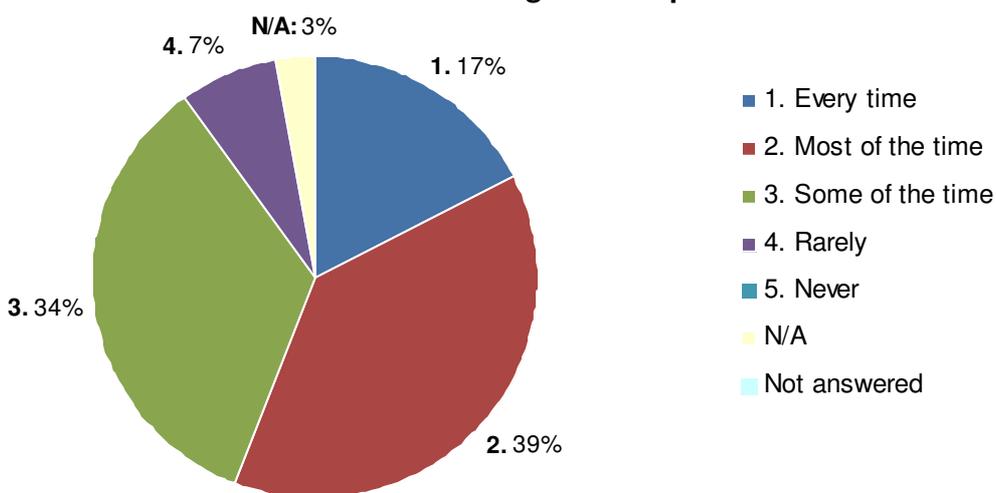
Q2. The use of the multiple-choice questions and flash cards helped me to understand the material when I attended lectures.



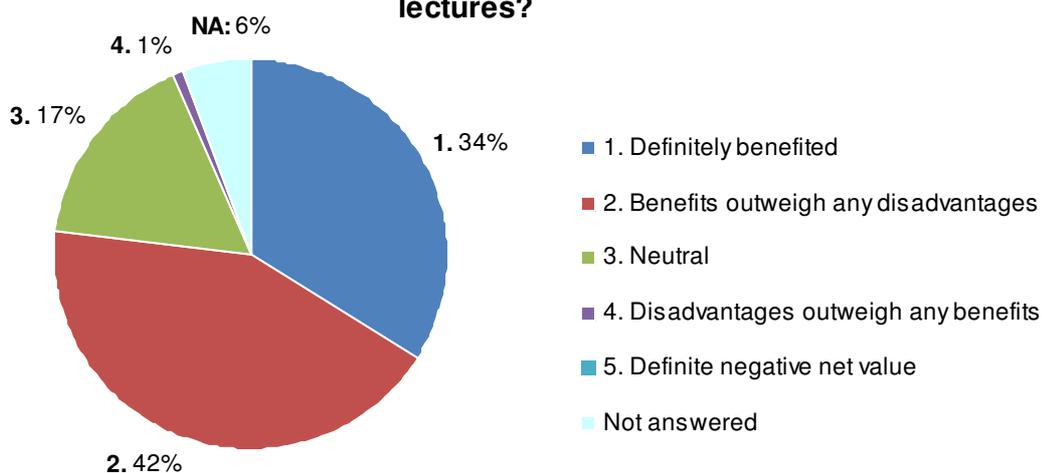
Q4. The use of the multiple-choice questions and flash-cards made the lectures more interesting.



Q6. The discussions with fellow students helped to improve my understanding of the topic



Q12. What (for you) was the balance of benefit vs. disadvantage from the use of the multiple-choice questions and flash cards in the lectures?



Sample comments

Benefits

Improved understanding (6/61 comments)

- More interesting; answer explanation clarified some misconceptions; discussion with others helped me understand
- Consolidation of lecture material

Improved attention (12/61 comments)

- Made me pay attention to the question a bit more
- Interactive nature of cards meant I was tuned in to the lecture
- Helps me pay attention & learn more

Useful feedback (4/61 comments)

- Feedback during lecture
- Made lectures more interesting. Good way of communicating with lecturer. Allows lecturer to point out common errors & explain why they are incorrect.

Interaction and engagement (34/61 comments)

- Made us use our brains
- Made the lecture fun and interactive; Kept me interested
- It made me think and focus on the question and the overall lecture. And if I don't know the answer/quite confused, I'm given the time to discuss with my friends
- Great mechanism for participation from everyone in lectures (something that's more than often hard to achieve)
- I actually thought about concepts being taught rather than just sitting there. When asked for a response, you tend to think about it more. It was also good being able to talk to other people as when you need to explain your answer you tend to remember it more, and if you're wrong, you get a reason why, not just the answer.

Helped with exam revision (4/61 comments)

- Helped know style of exam question; Made me think about previous work
- ... Good exam practice.

Disadvantages or Problems

None (9/33 comments)

- None
- N/A
- Can't think of any
- None really...

Takes up time (9/33 comments)

- Time wasting if left too long
- While ppl get used to it, can be a little time consuming.
- A lot of disruption to flow of lecture b/c of all the talking etc
- Can waste time if not guided by lecturer
- A little bit time consuming

Not enough time to think about answers (1/33 comments)

- Not enough time sometimes to put up a card that shows your opinion

Not anonymous (2/33 comments)

- I could see other ppl's answers

- Some case, the answer was influenced by those around

Other (11/33 comments)

- Not enough questions covered
- Needed more explanation of the answers - the answers weren't always explained why they were the answers in great detail.
- Only useful if most ppl participate ...
- It seemed to cause unnecessary chatter and talk when the formal lecture started again

Sometimes embarrassing (2/33 comments)

- Flash cards are not useful and can sometimes be embarrassing for the person
- Fear of an incorrect answer

Other comments

Positive (17/23 comments) 74%

- Highly recommended
- Overall it's good
- Great!
- I've never seen anything like these cards, they are a great idea and make Geography my favourite subject, even more than it was before
- They were great & made the lecture more interactive. 2 thumbs up.
- It was fun ... breaks the lecture up and gets everyone involved
- They were helpful and gave me more confidence in my answer.
- Made lectures more engaging, so definitely keep using them - maybe even more so.

Neutral (5/23 comments) 22%

- Not so much useful to help understand the material, more helpful in keeping ppl attentive and reinforcing ideas
- Do more than just 2/3; Questions set out as they would be in exam; not ambiguous; not such long winded questions (hard to follow)
- Good idea, could be better implemented ie. Better questions posed; Flash cards fun & something different for students; perhaps doing this every lecture will create a greater level of engagement amongst students.

Negative (1/23 comments) 4%

- It doesn't work in such a large lecture. There should be more tutes for discussion purposes.