Interactive lectures: the Student Perspective

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The author (s) of this guide:
Pat Gannon-Leary, Chris Turnock & Mike McCarthy
Northumbria University

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Interactive lectures: the Student Perspective

Introduction

The lecture has been a classic approach to university teaching for hundreds of years. This approach was especially relevant when access to text-based information was limited. However, lectures are considered by many to be a teaching method that often fosters passive learning (Bligh 1998), in which students’ attention span is approximately fifteen minutes, yet lectures frequently exceed this figure by at least another thirty minutes. In such situations, student engagement with lecture material is likely to be at best superficial and more likely fail to have any significant impact upon the learning process. Consequently, the educational usefulness of such lectures comes into question.

The interactive lecture is an alternative approach to the lecture exists. Recent technological development offers a way in which a lecture moves seamlessly from being a one-way transmission of information from the lecturer to the student, to an approach that uses interaction to make students active participants in lectures. Unfortunately the evidence base demonstrating the educational benefit of the interactive lecture is limited. Both d’Inverno et al. (2003) and Elliot (2003) showed that it led to improved concentration during lectures and greater enjoyment. Another study reported some improvements in attendance at tutorials (Witt 2005). Tentative claims for improved test scores following the use of interactive lectures (Stuart et al. 2004) suggest confirmation of an earlier study involving use of a simpler technology (Poulis et al. 1998).
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Others report how interactive lectures can be used to engage students in experiments as well as to take student feedback to change the shape of the lecture based on the nature of the response (Draper and Brown 2004). Kennedy and Cutts (2005) point out that other research has demonstrated user satisfaction with interactive lectures, but with little explicit evidence about the impact of interactive lectures upon student learning.

The use of interactive lectures at Northumbria University has slowly increased over the last two years since initial use in 2001. This phenomenon provided an opportunity to undertake a long-term project to explore the educational benefits of interactive lectures. The first phase in this project involved examination of current users’ perspectives upon the usefulness of interactive lectures, with the following aims:

- Ascertain student perspectives on usefulness of interactive lectures.
- Assess impact of interactive lectures upon student learning.

This project was initiated by the University Learning and Teaching Independent and Innovations Enhancement Group (IIEG) to examine the use of interactive lectures at Northumbria University. A Red Guide has already been produced on the principles, possible uses, benefits and limitations of PRS systems,¹ so it is not proposed to dwell on the detail of such systems here.

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Methodology

The researcher obtained a list of academic staff within the University who were believed to be using the PRS system. Interviews were conducted with those members of staff who were using the PRS system and they were asked to try to recruit volunteers from students who had attended their interactive lectures.

The data collected from student interviews were analysed following the principles of qualitative data analysis involving thematic coding, guided by intuition and experience of relevant and irrelevant responses to interviewer questions recorded in the transcripts.

Three staff were interviewed\(^2\) from Applied Sciences, two from Computing, Engineering and Information Sciences, one staff member from the School of Law and one from Psychology and Sports Sciences. The subject areas covered are not indicated in this report in order to preserve participants’ anonymity.

In some instances staff were able to put the researcher in touch with students in order to conduct interviews with them. Three students were interviewed from Applied Sciences, two from Computing, Engineering and Information Sciences and three from Psychology and Sports Sciences.

\(^2\) Comments from the interviews with staff are reported in the companion RECAP guide: Interactive lectures: The Staff perspective.
Results

Programmes using interactive lecture

The majority of lecturers using the interactive lectures (PRS) facility used it with first year students, e.g. on a module with a high failure rate; for induction; on an introductory core course where students have little background in the subject; and on a skills module. In some instances lecturers used it with level 5 or final year students, e.g. on a group option module with a mixture of full and part time students. One lecturer remarked that:

“You can use it across the years. I use it from first to third year”

However, another lecturer stated that:

“I wouldn’t go any further than the second year at the moment, because I think that the group would not benefit in view of the types of teaching that I do...there are constraints in the way that I’m currently applying it.... There is a potential for expanding it, but I wouldn’t want it everywhere and for everything that I do, and I think it’s the same view across the division.”

Feedback from lecturers about the effect of interactive lectures on student learning

Two particular benefits of PRS use identified by lecturers were that students became engaged in what they were doing, and that students participated more.
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Use of PRS broke the lectures up and got students thinking in a non-threatening environment:

“Most of them will engage in the task that you’ve set them, and you can see them actually thinking about the task. If you set a task that you don’t use it with, then the participation rate drops. So it’s quite a good thing to use.”

One lecturer commented that in the past, he had used all sorts of strategies to try to improve participation:

“I’m going to pick a male to do it... I’m going to pick a female... I’m going to pick everyone who’s wearing a red jumper... I’ve tried all of those, and there are always one or two who still aren’t participating...but with PRS it was probably 100% participation because everyone had a gizmo, so whether it was novelty value or not, I don’t know, but everyone did participate, so it was much better than normal.”

Another benefit to students identified by a lecturer was that students found out more about what their peers were thinking:

“If you’re in a big class, it’s quite anonymous, and you think you’ve got a good idea about what’s going on, but do you really know what your neighbours have an idea of? I thought that one of the more successful points was that individuals in the class could then see where they figured, amongst their peers. Again, they hardly ever get that.”
Three lecturers identified PRS as being particularly beneficial for international students. PRS helped them communicate with their UK national peers:

“Whether it has increased their own ability to make judgements about an activity…I don’t know. There is an interaction there, but I can’t gauge the quality of the interaction”

One lecturer was conscious that her accent, combined with the fact that she talked quickly, might be problematic for international students:

“PRS is really good for the lecture as a diagnostic tool. International students really are quite reticent about putting their hands up: ‘Didn’t really catch that… not too sure’. So I’ve got a great hope for PRS in trying to help those guys get to grips with things, and also as a check for us.”

Her colleague pointed out that, using the PRS system, they showed a slide then asked a question followed by ten or fifteen minutes discussion of that question:

“Hopefully they have time to take it in, rather than you just flicking through slides, because they’re probably trying to write it all down, and not thinking about what’s been said.”

Two important issues reported by lecturers are trust and confidence. In small classes it is quite conceivable that class members will be able to identify a student who is continually making an incorrect response using a PRS handset. Where students knew each other well, this could be handled in a humorous manner, which was exemplified by a final year class:
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“They were saying: ‘Who’s number 13? You’re getting it wrong all the time.’ And number 13 would just say: ‘Get lost!’”

In larger classes the issue did not arise, but the lecturers said that they would be reluctant to use PRS in a small first year group where social relationships might be less robust.

Some lecturers found the PRS system useful for formative assessment, pointing out that use of PRS meant that students received almost instantaneous response and feedback. One lecturer stated that this was particularly useful in large classes because of the difficulty for a lecturer to provide feedback to the whole class. One of his colleagues corroborated this view:

“In Science…I think that in general, we over-assess them…we’ve got such large numbers that there’s a time lag between them doing the work and getting the assessment back…with PRS this has been one of the key opportunities where they’ve got instant feedback. That’s really quite tricky to achieve in Science in our classes.”

Another lecturer described how both he and his students were getting formative feedback during a session delivered using PRS:

“The lecture … had a number of potential pathways, and depending on the responses I was getting, I was going back in a loop to reinforce a point, or I was going down an alternative leg… using it as a formative guide to me, in terms of how to structure that session. But also as a formative activity for
the students... I was giving a few test questions and you never know whether it works or not... but I was using it as a sort of guideline for me to decide what to reinforce or what to skip over.”

Overall, lecturers reported positive responses to PRS from students, but they did qualify this:

“One of the benefits is that it’s very different in the lectures...but I think that if it was everywhere it would become just another thing that’s done.”

“You have to be careful about how you use it. The material that we’re moving on to this semester is fairly suitable.”

Measuring the impact of interactive lectures

Several of the lecturers had used PRS to get instant feedback from students about the use of PRS in their lectures:

“I had a range of options ranging from, ‘this is great, I like using it....’, down to ‘I never want to use this again.’ The instant result was very positive... I got a graph on the screen straight away...”

“I did some questions as to whether they liked it or not, and it was almost unanimously positive across the group that they liked it.”

At the end [I asked]… “Has this helped your enjoyment of the class?”... About 98% said yes. “Would you like to use it again?”... Again, about 98% said yes. So given the size of the class, there was only about one person
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who was disagreeing… so it was very positive feedback.”

“I got some feedback, and I used PRS to get it… and it depends so much on the questions that you ask. “How many of you have enjoyed using this?”...And it was something like 98%, so that was great.”

Some feedback was obtained in other ways:

“It has been mentioned at the staff/student liaison committee by the 1st year representatives as being a useful part of the course at 1st year level – which is positive.”

“On the student evaluation, the system was highlighted as one of the big positives on the module.”

“The students remember using it. You’ll talk to students 2 years after they’ve been in a lecture, and they’ll say, ‘are you going to use that system again?’ It can be very positive in that students enjoy using it.”

Lecturers discussed how the impact of interactive lectures on student learning might be measured. One lecturer had looked at pass rate on his module:

“There were only five students who failed out of 180, whereas before it had been 58%. There were other things that we’d done to the module, but the system certainly contributed to it…”

Another lecturer had asked the same question twice with her second years, in respect of what plagiarism was and what examples could be given. She reported that there
was a ‘definite shift’ in student understanding and exemplification of the concept.

A third lecturer had looked at the assessment of his module based on his students’ portfolio:

“I looked at the portfolio sections over the previous years, and it had changed a little bit, but there was no marked improvement in performance. So it was difficult to assess.”

Lecturers also discussed how far it might be possible to measure the impact of PRS on student learning. The lecturers who had measured student understanding of plagiarism hoped to study the record of incidences of plagiarism in their division over the years to see if the incidence dropped. However, they had experienced some issues already with third year students who, it was assumed, would know more about plagiarism than first years:

“As it turns out, they don’t. The third year are paranoid about it, and their answers are worse than the first years. They’re just so much more concerned about it. So …the statistics may not be that significant, but the answers would be interesting.”

Another lecturer commented that there is a whole issue around how much knowledge and understanding is delivered in a lecture. Apparently it was quite low, so it is difficult to know how far one could measure impact. There was agreement among lecturers that the obvious way would be to compare the learning from an interactive lecture with that from a traditional lecture; running two classes in parallel, one with PRS and one without. A School such as NBS where two identical lectures were
run in parallel would be the ideal candidate for such a study but “even then you’ve got all the other questions such as have you got a true, random mix, or is one group of students just better anyway?”

The student perspective

Why students think their lecturers use PRS

Students saw two principal reasons for their lecturers to use the PRS system. Firstly, they saw it as a different approach which made lectures more interesting and held the students’ attention more effectively. Secondly, they believed it enabled their lecturers to get feedback on gaps in students’ knowledge and to highlight areas where lecturers needed to change their way of teaching or to go over the material again.

They described how their lecturers used multiple-choice questions ‘to see how much we had been learning’ and to pick up where they had been ‘going wrong’:

“He had a PowerPoint presentation and he was going through a couple of slides and he was telling us the information and it was a spot quiz. Every few slides he had a question for us. There was an answer like A, B, C or D. There were groups of two or three of us and each of group had a hand-held voting button. It was good because it keeps you on the ball. You can’t slip away. It is good for remembering key points. It showed up our results, what everyone said. It was anonymous as well, even though, at the end, we did kind of admit, it was us!”
PRS and student learning

The students interviewed thought that their lecturer’s use of PRS had made their lectures more ‘interesting’ and ‘exciting’. They felt that, rather than just going to a lecture to listen to what their lecturer was saying the PRS got them more involved:

“If you have already printed the slides from Blackboard, the tendency would perhaps be not to pay as much attention. With PRS, you’re involved in it... you have to take part... you have to be thinking about the questions.”

“It helped. Instead of just copying it all down... you got summaries now and then.”

“In a good way, it kept me from falling asleep as you do with something you don’t really understand because it is not of interest...because you have to remember what the answer is, running through them all.”
They believed that the use of PRS made them think more about what they had done and what they needed to do:

“I think that my learning improved, because it kept your concentration going, and you got a better understanding of what you were doing, and where you might be going.”

“The questions asked were quite difficult... so it made you do more... it made you think ‘I haven’t done enough work on this… I need to do more…”

Students felt that the PRS helped them with revision preparation for forthcoming exams:

“With coming up to the first series of exams at the University, it gave you a better understanding of the types of questions you were likely to get...It also helps you to start getting into the routine of revising... because the first two sessions were quite early on in the course.... Getting back into how to revise... thinking about questions.”

“It highlighted to me which areas I was weak on... but before you started revision... showing which areas you might need to concentrate on... and the questions gave you an example of the depth that you would have to go into.”
Others commented on the fact that interaction in the lecture was better:

“Some people just don’t like putting their hands up and asking questions... or answering a question... so it gets round that.”

Interaction in lectures was also facilitated where students shared handsets:

“When you share, it sometimes helps to have a discussion with the other person... you can work it out together.”

“We discussed things, and it helped working with someone else, because you talk about theories from the questions, because you may be a bit unsure. There was a bit more interaction.”

“It did prompt [debate. The lecturer] started us off but then we started discussing ourselves – arguing sometimes – about what the right answer should really be. Groups were talking to other groups. It got quite a lot of the class talking. It brought us together.”

**PRS and student attendance at lectures**

Generally the students interviewed said they would have attended their lectures whether or not the PRS was in use. However they did think it might be an incentive for some of their peers:

“Everyone was quite interested because it was a bit different, and questions were going to be in a sort of ‘Who wants to be a
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‘millionaire?’ format… So we all thought we’d have a look…”

“Definitely it was a case of trying something that was a bit new, that you hadn’t done before… so you were a bit more interested in going…”

“I think that people wanted to attend the lectures more, just because it was a bit different.”

Some believed that more students had turned up for those occasions when the PRS was used. One student stated that this is likely to depend on the individual:

“As regards attendance, I think its very much up to the individual to decide how much time they want to spend on it, depending on how much they want to get out of it, really. I just wanted to attend because I thought it would give me an insight into what I actually know…”

One of his peers believed that the PRS might make some of his classmates “realise that they’ve missed things in previous lectures, so they need to keep attending. The questions are quite hard and quite detailed… so I can see how that would affect attendance.”
According to the students ‘attendance’ improved, not only in terms of turning up for lectures but also in terms of ‘attending’ to the content of the lectures:

“It definitely helped you to concentrate more, partly because it broke the hour up into smaller sections.”

“It didn’t really affect me as regards turning up, but it probably helped with my concentration, as some lectures can be rather long and tiring, so when you have something else to do, that always helps.”

**PRS and student performance**

When discussing the difference use of the PRS in their lectures might have made to their performance, most students cited revision:

“Definitely in the second and third sessions… because for the first one, everyone did really poorly… so for the next sessions, because the questions…were quite demanding… there’d be no point in going if you hadn’t revised well…”

“It gave me more confidence in the types of questions that were going to come up… so I could then use that in the way I revised. So maybe a slight influence on performance, yes.”

“Yes… it certainly highlighted which areas I wasn’t sure of, which I hadn’t taken in enough during the lectures… so I had to do more reading on that subject, and also to
cover the lecture notes, to get it set in my own mind.”

“It could spark some people into doing more [revision]... particularly if they can see that they’re getting it right”

“It definitely helped me to remember little facts and figures more… it tested you, and if you got it wrong you would remember from that. It was useful revision”

What students particularly liked about PRS

The chief reasons students gave for liking PRS were that it was different, more interesting than traditional lectures with PowerPoint, and they felt ‘involved’. The element of competition made sessions more ‘fun’:

“Everyone was competing to see who could get the number on the board…”

“It was nice to see how you were getting on... you were given four choices of answer on the board, and your number would flash up, so you could see where you were in relation to the answers.”

The anonymity of PRS use was appreciated:

“If there were individual things and someone was a bit shy and would not normally shout out in class, at least they have a way of interacting…. they can see an overall thing. They know themselves whether they got the answer right or not.”
The interactivity with their peers was another element of PRS that students enjoyed:

“We got to work with our friends. We worked in twos, because we were sharing a handset, so we were able to talk about what was going on, and interacted more than we would do in a conventional lecture.”

“We were able to work in small groups, or in pairs... to answer the questions. We were able to discuss things... you wouldn’t get that so much in a normal lecture.”

Others pointed out how PRS provided improved understanding of key topics:

“[PRS] addressed the key areas... so it gave you a better understanding, and for me, it gave me the confidence of knowing what to expect.”

“[PRS] highlighted the areas I was weak on. I definitely liked that.”

“[PRS] gave you instant feedback, so there’s no way you can go wrong. If you get the wrong answer, you know straight away.”

What students disliked about PRS

None of the students had any major dislikes about PRS from a pedagogical perspective but there were a few comments about technological and timing aspects:

“It took a long time to get set up. Also, because it’s a big class...it took quite a while to get everyone registered on the system,
and then you were never sure if your vote was registering.”

“Sometimes it was a bit time-consuming... say if there were technical difficulties with the handsets... having to wait for everyone to sort that out.”

“Sometimes the technology was a bit hard to use... you kept pressing it and it didn’t really work right away...”

“When we were using the laptop, the IT guy...didn’t seem to know much about the technology. It was a struggle to get it going... it took a good half hour to 45 minutes just to get one question done... so we didn’t use it after that...”

Would students like more interactive lectures?

The overall consensus was that the students would like more interactive lectures. However, they stressed that one of the advantages of the PRS was its novelty value and it was preferable to use it ‘once in a while’ rather than all the time. It provides added value to lectures as it makes the lecture and its content more memorable. Even if some of the novelty value was lost through overuse, it did result in more interaction, which most students appreciated.

Consideration should be given to the technological and timing constraints:

“As long as they knew how to use the system, and it was quicker... Make sure that everyone has a handset and that they’re all
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working. Time-wise, they’re not too great, but it makes it a bit more interesting”

They appreciated that use of PRS could mean extra work for their lecturers:

“It may be down to the lecturers or tutors having to prepare and set all the stuff in the first place.”

“We could have maybe done with a few more questions [than the two or three]. It is extra work for the tutors but I suppose it is just like with PowerPoint, they use them again and again every year so I can’t see that being a major problem.”

Several students suggested the use of PRS at the end of lectures, in combination with the more traditional format, and as a recap/revision aid at regular sessions throughout the course:

“Maybe at the end of some lectures they could use it to check your understanding.”

“Try to combine the two types of lectures, so you get your information from the PowerPoint presentation, and then there’s some element of feedback, and being involved… just something brief.”

“You could have a quick summary session at the end of a lecture, with say, 5 questions… just to see if you’ve taken it in…. you could go back… say split it up into sessions every 3 or 4 weeks…”

“Use it as a way of breaking the course up into sections... so it narrows down where
weak areas or positive areas are... and that's really useful.

Students appreciated that use of PRS might not be appropriate in all subject areas:

"With some lectures it is difficult to have certain answers. It might be more personal opinions."

Surveys were identified as an additional use for PRS. For example, using surveys lecturers could identify overall weaknesses in classes. PRS could also be used for course evaluations:

"Whether or not you've enjoyed the course... like where they now do written questionnaires... they could use PRS for evaluation instead... you suffer from questionnaire overload sometimes... that would help, and it would also save paper."
Conclusions and recommendations

This study indicates that the use of PRS in lectures offers the potential for enhancing student learning. However, there is as yet limited robust evidence to support intuitive comments.

Before more work can be done into examining the impact on learning of systems such as PRS it would be preferable if the system were in more extensive use over a number of modules over a number of different subject areas rather than the limited number of champions in existence at the moment. It would also be useful to make comparisons with PRS use in other institutions, e.g. Glasgow Caledonian University and the University of Edinburgh.
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Bibliography


