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Mccullagh, K

Title	Click happy?: an analysis of the use of an Electronic Voting System (EVS) in large group lectures to improve interaction and engagement
Authors	Mccullagh, K
Type	Conference or Workshop Item
URL	This version is available at: http://usir.salford.ac.uk/17006/
Published Date	2011

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Paper 68 – Full Paper

Click happy?: an analysis of the use of an Electronic Voting System (EVS) in large group lectures to improve interaction and engagement

University of Salford
Salford Law School
Lady Hale Building, University of Salford
Salford
M5 4WT
United Kingdom
k.mccullagh@salford.ac.uk

Abstract

This paper outlines the findings from an action research study conducted at Salford Law School; reporting the responses of students to the inclusion of an electronic voting system¹ (hereafter referred to as 'clickers') in large group Undergraduate Public Law lectures. The paper begins reflecting upon my current lecture practice in the context of existing literature and by reviewing feedback from previous cohorts of students. This reveals that the traditional, didactic lecture style, commonly employed by law lecturers in the UK has been criticized for fostering student passivity and resulting in surface learning (Ramsden, 1992). In contrast, studies carried out in pure science disciplines; medicine, engineering and mathematics (Hake, 1998; Crouch and Mazur, 2001) indicate positive results from use of clicker quizzes, in terms of increasing student interaction and engagement. Accordingly, I decided to incorporate clicker quizzes into lectures, and measure student responses to this change in teaching practice. The findings indicate that clicker usage increased student interaction and engagement. This study concludes that clickers should be used on an ongoing basis in Public law lectures, and also indicates positive support from students regarding the use clickers in other undergraduate law subjects. Furthermore, although the findings from this action research study are not generalisable, the responses suggest that clickers could be an effective teaching tool in large group sessions in other disciplines, since they replicate findings from previous studies in other disciplines.

1. Lectures: the pedagogic benefits of student interaction and engagement

There are distinct advantages associated with the lecture method, especially in relation to legal education. Considering the large number of undergraduate students studying law, it is an effective way, both in terms of time and resources such as staffing and room availability, to impart information quickly and efficiently to a large group of students. Also, a lecture essentially provides a guide and the conceptual framework for further reading, a vital part of legal education. Thus, lectures are, and will remain, central to legal education.

Nevertheless, Ramsden (1992) found evidence to associate lecturing with surface learning, whilst others have criticised lectures for fostering student passivity, as a didactic approach to

¹ An EVS consists of a clicker/keypad for each audience member, a receiver, and software that allows audience members to respond to questions posted by the presenter. Responses are aggregated real time on a screen, the results then form the basis of discussion. Lowery (2005) and Barber *et al* (2007) provide in-depth overviews of the available interactive systems and their relative merits.

lecture delivery is the norm in UK Law Schools. Indeed, the scenario described by Gower that:

“a lecturer dashed in at five minutes past the hour, gabbled dictation until five minutes to the hour, barked forbiddingly “any questions?” and then dashed out again” (1950, p. 137)

accurately describes some of my experiences as a student. Moreover, Laurillard (2002) identifies dialogue between teacher and learner as the heart of the educational process. Consequently, she dismisses large group teaching, such as lecturing, as an environment where effective learning cannot take place, because of the lack of opportunities for dialogue. Thus, for students, lectures can be a passive activity, in that a one-way communication channel is established between the lecturer and students, and this form of communication can easily be disrupted by factors such as an unresponsive audience, large group size, inaudibility etc. As a result, many agree with Bligh (1972) that this style of lecturing is not a good way to promote thinking and deep learning. Accordingly, it was appropriate to reflect on my lecturing practice, to ensure that it is of optimal benefit to students, and to consider enhancing my lectures by adopting good practice findings identified in a literature review.

2. Reflection on lecturing practice & potential enhancement

I have delivered lectures in Public law at Salford Law School since 2008. The Public law module is studied by first year LLB (Hons) Law Students, and second year LLB (Hons) Law with Criminology and second year LLB (Hons) Law with Finance students. Although the Module Evaluation Questionnaire feedback for the period 2009-10 was largely positive, a small minority of students commented that:

“[the subject was] difficult at beginning. Lots of new stuff to remember...find it demoralising.”

Also, a few students recommended that the lectures:

“Have more group activities” and “have a variety of teaching methods”

Studies on the use of clickers in lectures by Hake (1998) in undergraduate physics classes and Northcott (2001) in MBA classes indicate that an interactive lecturing style which encourages student participation promotes deep learning. More specifically, Simpson and Oliver recommended using clickers as a tool in lectures on the basis that they:

“appear to have the potential to enhance learning and motivation, as well as providing variety and engagement within lectures.” (2006, 1)

Likewise, one study in the USA on the use of clickers in law lectures by Caron and Gely (2004) reported that clicker technology:

"responds to the failure of law school teaching to encourage active learning by the entire class. Unlike the traditional Socratic method, which engages one student at a

time, the CPS [class performance system] extends the dialogue to the entire class by requiring each student to respond to each question."

Similarly, Burton (2004) reported her findings from using clickers in one week of Property law lectures in Australia. She reported positive findings in relation to student engagement, participation and feedback. She further contends that clicker use could enhance the teaching of any legal subject, not just property law, stating:

"If the area of law is black and white, the law lecturer could create PowerPoint slides that have multiple choice questions, true or false questions or yes or no questions. If the area of law is grey, perhaps the lecturer could create a statement and ask the law students to agree or disagree. The responses to the statement could lead to a discussion within the lecture group."

In the UK, Easton (2009) used clicker quizzes on one occasion in an undergraduate Public law lecture and on one occasion in a postgraduate criminal law lecture. She reported positive findings, but indicated that the positive response of clicker usage could be influenced by its novelty value, i.e. that if employed in a series of lectures, students could suffer from clicker fatigue. A similar observation was made by Simpson and Oliver (2006) who stated that clickers can provide an extremely effective aid to teaching and learning but students react badly to clicker use "just for the sake of it."

3. Rationale for action research study

In response to these feedback comments and literature review, I decided to undertake an action research study in order to gain a greater understanding of my own practice and the students' behaviour, so that I would be:

"empowered to make informed decisions about what to change and what not to change, link prior knowledge to new information, learn from experience (even failures) and ask questions and systematically find answers" (Fueyo & Koorland, 1997, cited in Mills, 2003, p. 10).

The focus of this action research project was the decision to employ 'clickers' to conduct multiple choice quizzes at the beginning of nine lectures in a twelve week semester,² in order to enhance the teaching methods employed in lectures. Students collected a clicker and a paper copy³ of the quiz as they entered the lecture theatre. The quizzes typically comprised of 5-7 questions based on information delivered in the previous lecture and lasted 15-20mins. After each question was displayed on screen, students were given a few minutes to select an answer (they were free to consult their peers before choosing an answer). The aggregate responses were displayed in the form of a bar chart, thereby providing immediate feedback to the students. If the responses indicated that students were unsure of the correct answer then the lecturer would engage in a question and answer dialogue with the whole cohort, in order to encourage students to actively engage in a peer led recap of the issue, before moving on to the next quiz question.

The Project had a number of objectives, including:

² On one occasion the technology failed, so the quiz was conducted by asking the students to raise their hands to select the correct answer. It was immediately obvious that a significant number of students refused to raise their hands for any answer.

³ They could use it to record the correct answer and/or use them as revision aids at a later date.

- Assessing the usefulness of employing clickers to increase student interaction and engagement in lectures.
- Assessing the preferences of students i.e. would they prefer traditional 'hands up' Q & A sessions, or, is the anonymous nature of clicker responses a positive feature
- Assessing the usefulness of clickers in building student confidence in through recap questions.
- Assessing the usefulness of clickers as a tool for providing formative feedback.
- Assessing whether clickers should be employed on a regular basis in lectures in this and other law modules, in the future.

At the end of the first semester, I developed⁴ a survey in order to evaluate the use of clickers in Public law lectures.

4. Public Law 'Clicker Quizzes' Evaluation Survey

The survey participants were recruited from an UG Law module, after Ethical Approval for the study was granted. All students registered on the module were given an opportunity to participate on an anonymous basis in a clicker evaluation survey administered during a revision lecture at the end of the first semester.⁵ The survey comprised of two components. Firstly, an electronic multiple choice question survey was conducted, in which students used their clickers to respond to the survey questions. Secondly, students were given an opportunity to provide further comments via an 'Additional comment' sheet. The survey responses are discussed below.

5. Discussion of Public Law 'Clicker Quizzes' Evaluation Survey Findings

5.1 Increased engagement and interaction

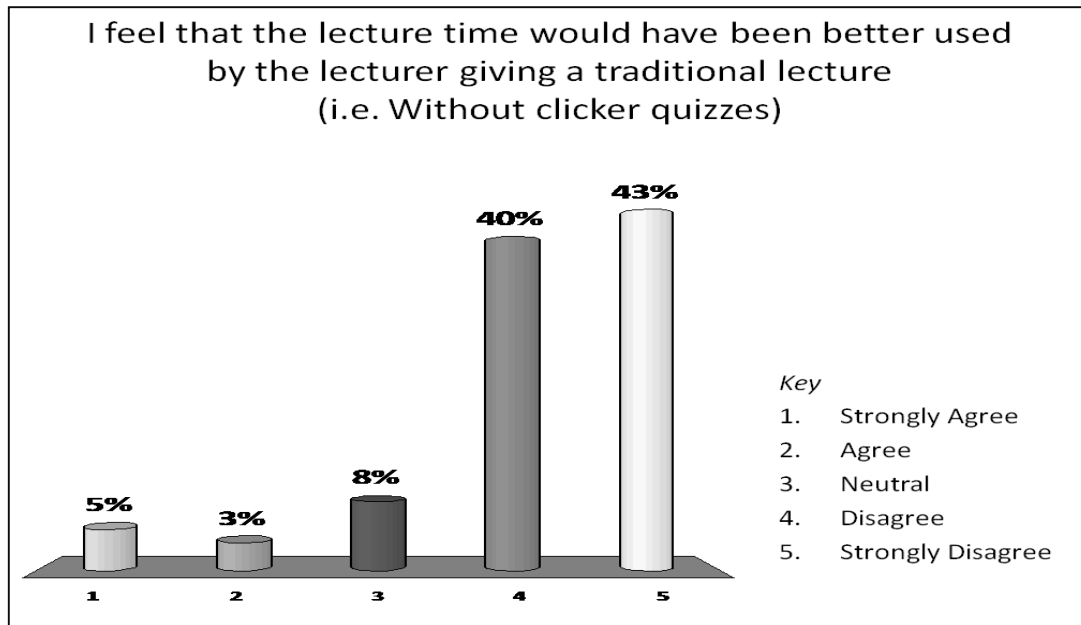
Due to a paucity of studies on the use of clickers in UK undergraduate Law lectures I had reservations about employing clicker quizzes on a weekly basis throughout a twelve week semester. My concerns were prompted by Oppenheimer (2003) who advocates that new technology should only be adopted where there is a solid pedagogical rationale for its employment, and particularly cautions against adopting new technology on the basis of its novelty and availability. Similarly, Kirkwood and Price (2005) state:

"teaching and learning in higher education are unlikely to be improved simply by the application of new technology...the medium itself is not the most important factor in any educational programme - what really matters is how it is creatively exploited and constructively assigned."

⁴ It was piloted on Colleagues and PG Cert Study advisor.

⁵ Only 62 of the 125 students registered on the course attended the revision lecture.

Fig 1: Lecture activities



(Source: Public Law 'Clicker Quizzes' Evaluation Survey, 2010) (n= 62)

I'm pleased to report that Fig 1 indicates that 86% of the respondents disagreed or strongly disagreed with the statement that: "I feel that the lecture time would have been better used by the lecturer giving a traditional lecture (i.e. without clicker quizzes)" whilst only 8% agreed or strongly agreed with the statement. Thus, although one student commented that:

"The time taken (cost) outweighs the knowledge gained (benefit)"

other students responded more positively to the use of clickers in lectures, on the basis that their usage:

"Helps break up the lecture, as there is not just two hours of pure dictation."

And also that:

"They do provide a more interactive and stimulating environment, enabling discussion with peers upon the particular topic in question."

Similarly, another student indicated that:

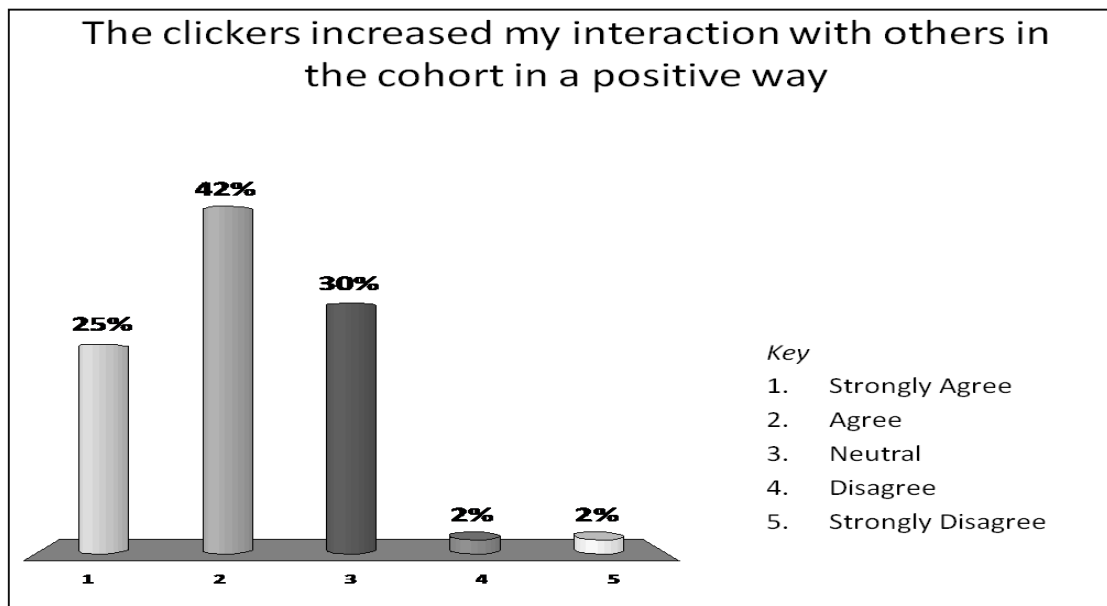
“The clickers were a good idea as it made the lecture more fun as it wasn’t pure lecturing for a full two hours and was a useful revision aid for the topics to refresh your memory at the start of the lecture, and a good way to wake you up at 9am!”

The survey responses and additional comments indicate overall support for the inclusion of clicker quizzes in lectures. Students valued the change the lecture from pure transmission to facilitated interactive dialogue between the lecturer and students, which accords with Laurillard’s recommendations.

5.2 Peer learning

When the action research study was originally designed, I was specifically interested in testing the clickers as a tool for promoting and increasing dialogue between students and the lecturer. However, during the semester, I observed that although students were not specifically instructed to engage with their peers it occurred spontaneously and sporadically, and further, that as the first year students gradually formed friendships they increasingly used the quiz questions as an opportunity to interact with each other, often conferring prior to selecting their responses. I explored the literature and discovered that studies (Mazur, 1997; Crouch and Mazur, 2001) indicate that students value the opportunity to engage with peers. These studies also demonstrate a higher level of conceptual understanding and assessment performance by students following the usage of clicker quizzes in physics lectures to promote discussion and debate amongst students. Accordingly, it was appropriate to ask the students to reflect on whether the clickers had increased their interaction with fellow students.

Fig 2: Increased student interaction



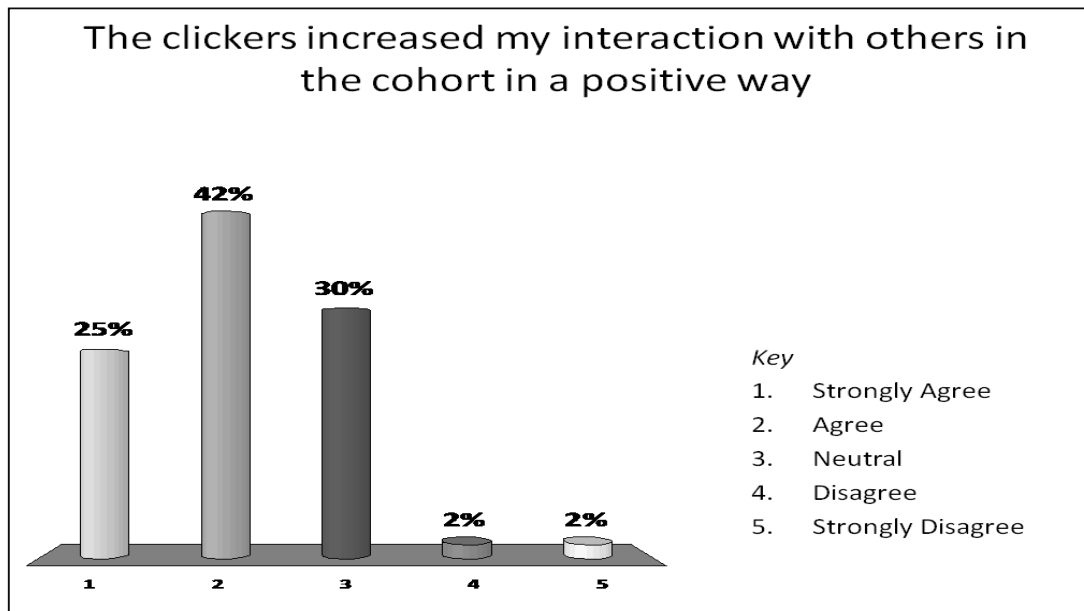
(Source: Public Law ‘Clicker Quizzes’ Evaluation Survey, 2010) (n= 62)

Fig 2 shows that 67% of students indicated that the clickers increased their interaction with others in a positive way, whilst 30% of students were neutral about the impact of the clickers on their interaction with peers. A future action research study could explore whether peer interaction could be increased by including problem questions and specifically instructing students to work in pairs/small groups for designated periods to answer the problem questions.

5.3 Review Prior Understanding

Herr (1994) reports that using clicker technology can enable the lecturer to evaluate any gaps in knowledge or misconceptions and build responses to these into teaching strategies. In this study, clickers were employed at the beginning of lectures to assess and refresh understanding from the previous lecture.

Fig 3: Review of previous understanding



(Source: Public Law 'Clicker Quizzes' Evaluation Survey, 2010) (n= 62)

Herr's findings are supported by this study, as Fig 3 illustrates that a substantial majority of students (90%) indicated that clicker quizzes helped them review their understanding from the previous lecture, as illustrated by the additional comment by a student:

"I find the clickers really useful for reminding myself of what was learnt in the previous week."

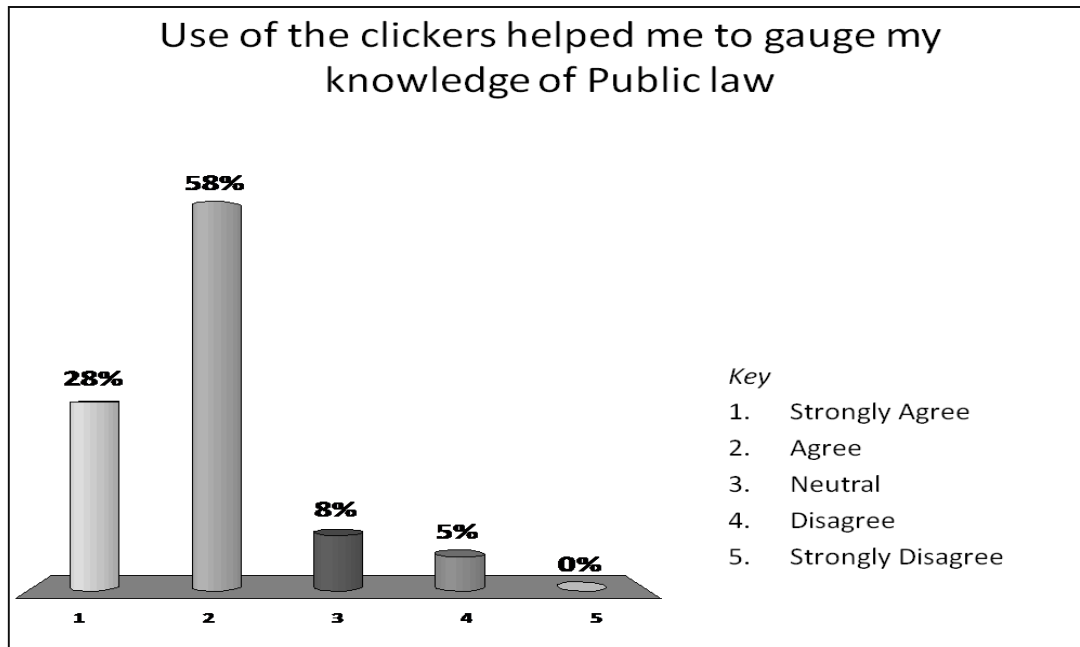
Similarly, another student commented that:

"I like when you give additional feedback and knowledge on answers."

5.4 Creation of teachable moments

Wood (2004) claims that a "teachable moment" arises when the lecturer presents a formative question relating to prior material and receives a very low level of correct responses. Concomitantly, Easton (2009) asserts that a lecturer prepared to adapt lecture delivery to seize upon a "teachable moment" determined through clicker use can, by revisiting a concept in a different manner, employ this situation to great pedagogical advantage.

Fig 4: Teachable moments: gauging knowledge



(Source: Public Law 'Clicker Quizzes' Evaluation Survey, 2010) (n= 62)

Fig 4 indicates that 86% of students responded that use of clickers helped them gauge their knowledge of public law. For instance, one student stated:

"I like the use of clickers as they allow me to become aware of what areas I need to improve my understanding of."

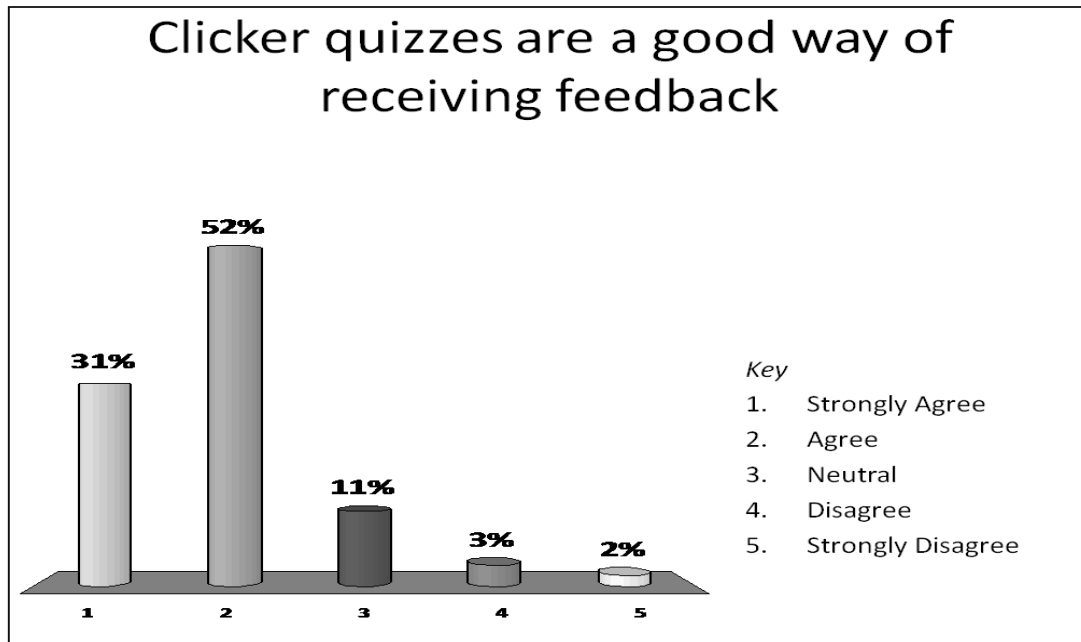
As a lecturer, I found the quizzes invaluable as a means of assessing student understanding of the content of the previous lecture. It allowed me to generate teachable moments in which I would recap and explain, where necessary, before proceeding to deliver the content planned for the lecture. The results also concur with Sabine's (2005) findings that after students determine that a large group of their cohort do not understand a concept they are much more responsive to any subsequent explanation of this concept, as in my experience students paid attention to the recap points when it became evident that some of them had selected the wrong answer.

5.5 Formative Feedback Opportunity

It is long established, e.g. Boyd (1973), Gall, (1984) that formative feedback produces positive effects on student performance. Moreover, Kulik and Kulik (1988) report that being called upon to answer frequent, structured questions and receiving immediate, constructive

feedback can significantly increase knowledge, enhance understanding and promote deep learning by students. More recently, studies on clicker use have reported improved assessment scores linked directly to clicker-facilitated constant formative feedback (d'Inverno *et al*, 2003).

Fig 5: Formative Feedback Opportunity



(Source: Public Law 'Clicker Quizzes' Evaluation Survey, 2010) (n= 62)

Fig 5 shows that a large majority (83%) of students indicated that clicker quizzes are a good way of receiving feedback. The findings also confirm that students appreciate immediate feedback, as illustrated by the comment:

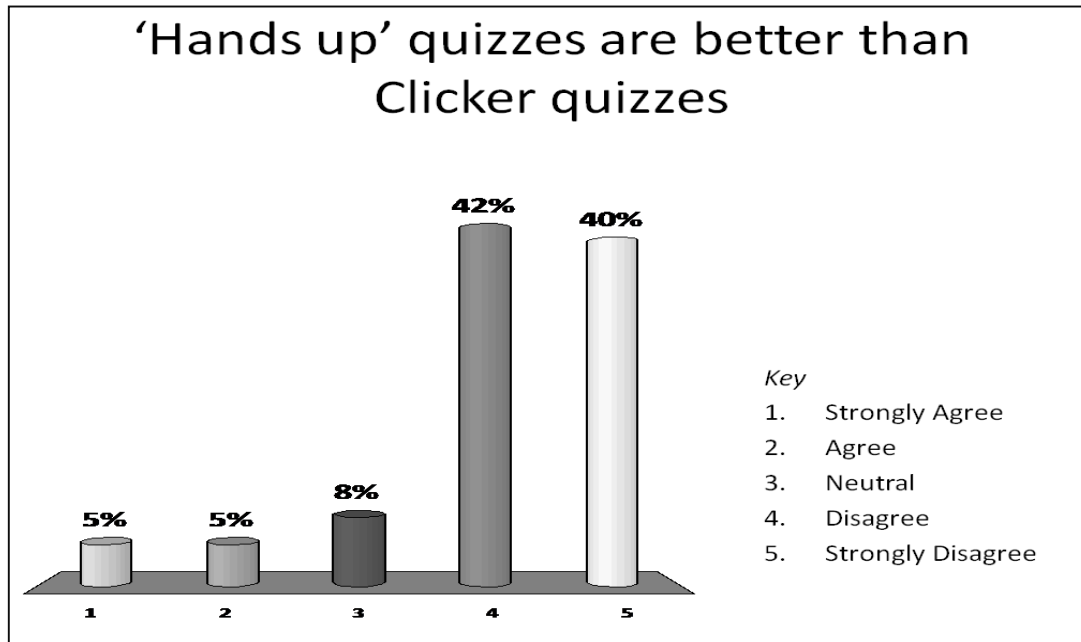
“Much better than handing up answers and having them corrected, as you are told where you went wrong/how to improve for examination.”

The preference for immediate feedback was further illustrated by students' responses to the next question.

5.6 Quiz delivery

According to Easton (2009) anonymous interactive devices could provide an ideal way to engage the more retiring student who would not possess the confidence to express themselves orally or via hands up quizzes.

Fig 6: Clicker v Hands Up Quizzes



(Source: Public Law ‘Clicker Quizzes’ Evaluation Survey, 2010) (n= 62)

The students indicated a strong preference for using clickers, as demonstrated by the survey finding that 84% of respondents disagreed or strongly disagreed with the statement that “Hands up quizzes are better than clicker quizzes.” The additional comments from students indicated two main reasons for preferring clicker quizzes. Firstly, the ability to conduct quizzes at a quicker pace and the immediacy of feedback:

“Yes, they [clickers] are quicker.”

“They [Hands up quizzes are] Much more time consuming. You want to see quiz answers straight away.”

“Hands up quizzes are more time consuming because all the people’s votes have to be individually counted. Time is important because lectures only last two hours.”

A second reason for preferring clicker quizzes was that students could respond anonymously, and did not fear giving inaccurate answers, as typified by the following comments:

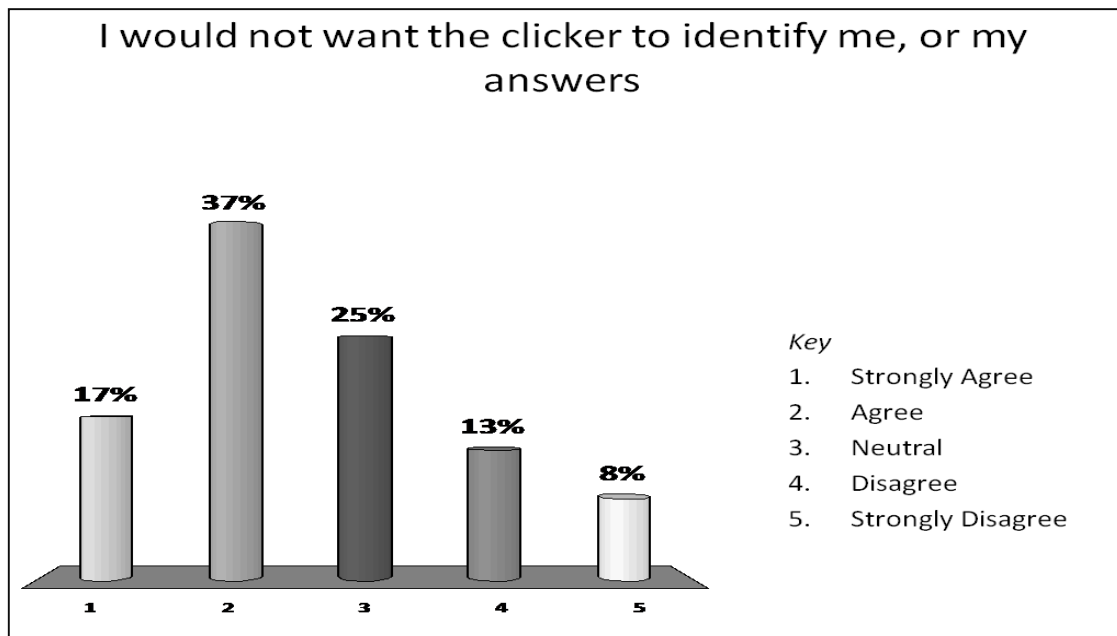
“Yes, clicker quizzes are not confidential. Everyone could see.”

“The clickers are an extremely mature approach in that ‘hands up’ just reminds me of teenage school years.”

5.7 Respondent Anonymity

The second reason offered by students for preferring clicker as opposed to hands-up quizzes concurs with previous studies. Indeed, an important pedagogical rationale for the adoption of clicker technology, as opposed to a show of hands, is that it caters diverse learners in that less confident students can be encouraged to participate (Davis, 2003; Draper and Brown, 2004).

Fig 7: Respondent Anonymity



(Source: Public Law 'Clicker Quizzes' Evaluation Survey, 2010) (n= 62)

Nevertheless, a wide range of responses were received in response to the statement: "I would not want the clicker to identify me, or my answers." Overall, a small majority (53%) indicated that they would not want the clicker to identify them or their answer. However, the distribution may be explained by the fact that a number of students drew a distinction between disclosing their performance to their peers and disclosing their performance to the lecturer. The additional comments indicate that a number of students would be prepared to allow the lecturer to monitor their performance:

"I wouldn't mind the lecturer knowing, but not the class!"

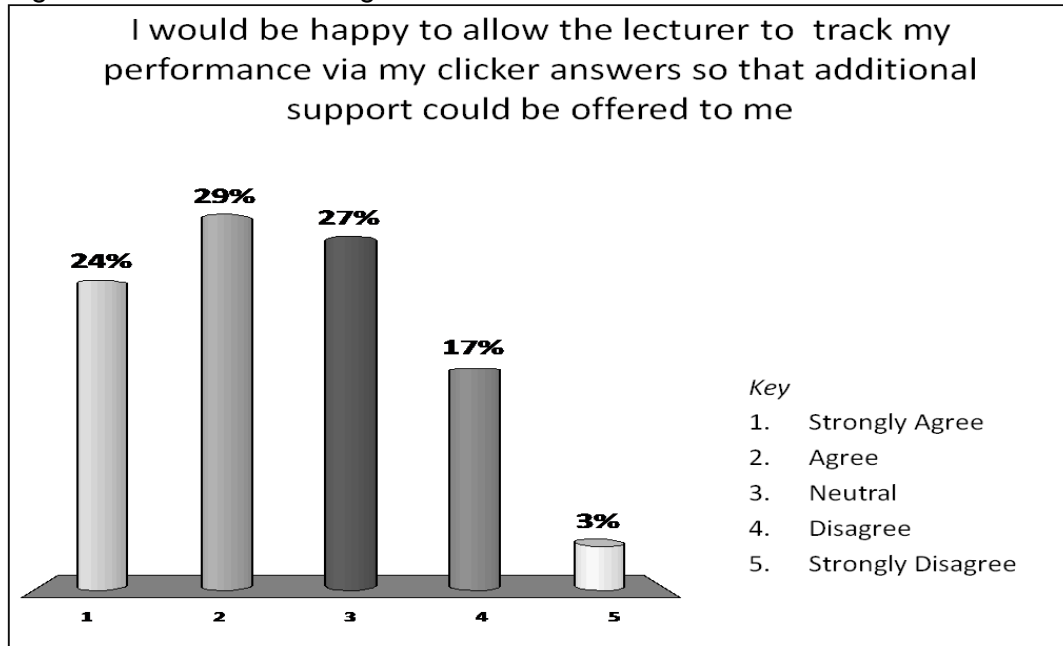
Similarly:

"Just so the lecturer could see, not everybody in the room."

5.8 Performance tracking

In this study, students were advised that they would be answering the questions on an anonymous basis, and that their performance would not be monitored. They were encouraged to retain paper copies of the quiz questions and correct answers for revision purposes.

Fig 8: Performance tracking



(Source: Public Law 'Clicker Quizzes' Evaluation Survey, 2010) (n= 62)

However, the survey responses indicate that a small minority of students (53%) would be happy to allow the lecturer to track their performance so that additional support could be offered. The additional comments offered by students indicated that they appreciated the pedagogic rationale of performance monitoring:

“They would be a good way for the lecturer to spot people who are falling behind or who are doing well. It would be good to spot the weak students before the exams, as we don’t want to fail. So, the lecturer could monitor progress and maybe have one to one meetings to reflect on progress and work out what needs to be done.”

Astutely, one respondent noted that in the absence of performance monitoring, some students may not have prepared appropriately to derive maximum benefit from the formative feedback opportunity:

“Clicker quizzes do not actually guarantee that students have revised, or will revise beforehand. Therefore, lecturers monitoring students may help guarantee revision.”

Similarly, another student advocated performance monitoring on the basis that it:

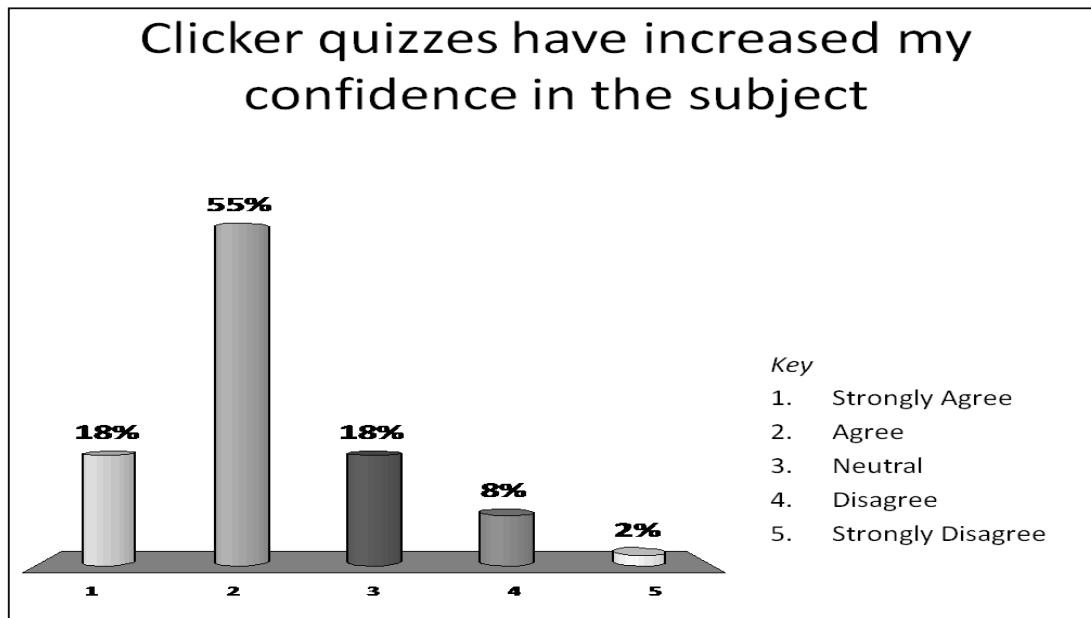
“Could motivate you to actively do revision, read over notes beforehand.”

5.9 Clicker fatigue v Increased confidence

One reason for conducting clicker quizzes on a weekly basis was that it might increase student performance in the subject. However, Easton (2009) expressed a concern that a

different outcome could result, namely clicker fatigue i.e. that students tire of using the technology because they do not feel it benefits their studies.

Fig 9: Increased confidence in subject



(Source: Public Law 'Clicker Quizzes' Evaluation Survey, 2010) (n= 62)

I'm pleased to report that 73% of students indicated that the clicker quizzes increased their confidence in the subject, for two main reasons. Firstly, it helped them assess and monitor their own performance:

"[Clicker quizzes] Help you know what you know"

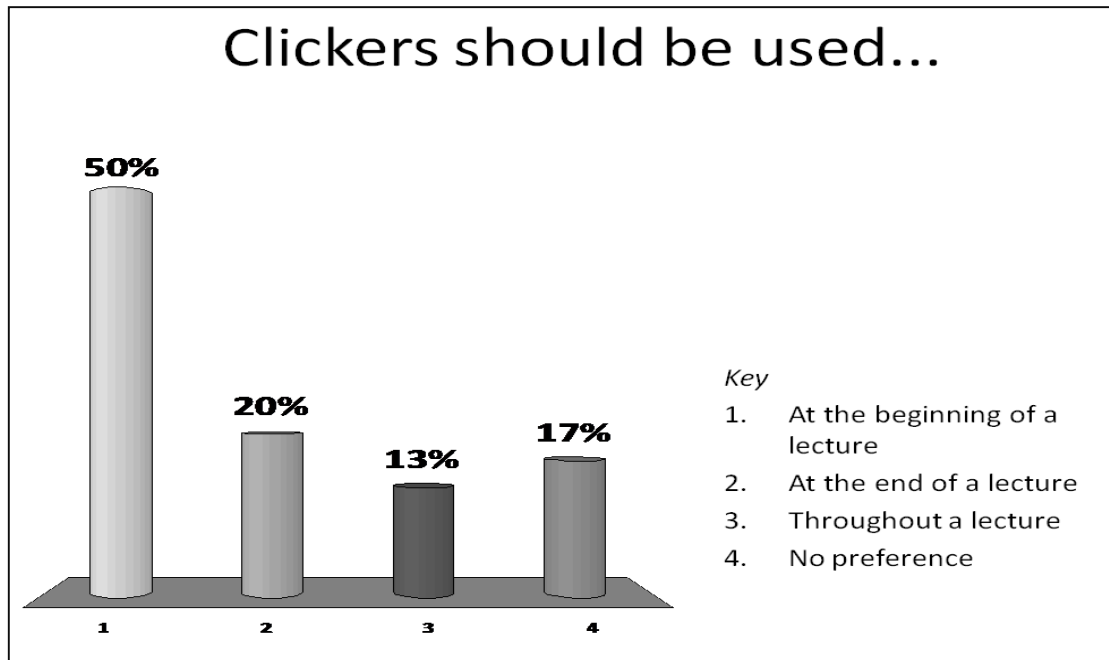
Secondly, it helped them assess and monitor their performance in comparison to their peers:

"[Clicker quizzes] Helps you know if you are on the same level as your peers."

5.10 Quiz placement

Allen and Tanner (2005) have indicated that clicker quizzes should be used throughout lectures in order to promote interaction and engagement, and periodically assess student understanding of lecture materials. However, Lloyd (1968) stresses the importance of the first five minutes of a lecture which is often the period most effectively recalled by students and which is often disrupted as the students take time to settle down. Accordingly, I decided to administer clicker quizzes at the beginning of lectures to compel students to engage with the valuable early minutes of a lecture presentation

Fig 10: Quiz placement



(Source: Public Law 'Clicker Quizzes' Evaluation Survey, 2010) (n= 62)

Fig 10 indicates that half the respondents expressed a preference for using clickers at the beginning of the lectures, on the basis that they are:

“Good at beginning as the quiz gets your brain started.”

“Good at the beginning, gets you in the mood, and ready to learn, especially because the lectures are at 9am.”

“Good way of self-observation. Also, lecturer can see how students are doing e.g. If majority of students are getting the question correct, or if majority is getting questions incorrect maybe go over those points again.”

It is likely that this response was influenced by the fact that the quizzes were designed to operate as recap quizzes, to review and check student comprehension of the content of the previous lecture. However, if clicker quizzes were designed to check understanding as the lecture progresses (as opposed to recap quizzes) then previous studies (MacManway, 1970) indicate that it would be appropriate to use them throughout the lecture, on the basis the longest period of time for which students can effectively engage with a lecture is 20-30 minutes. This approach is supported by student responses, for instance, they commented that:

“They could be used at any point during a lecture.”

Whilst a number of students suggested that quizzes could be used to open and close lecture sessions:

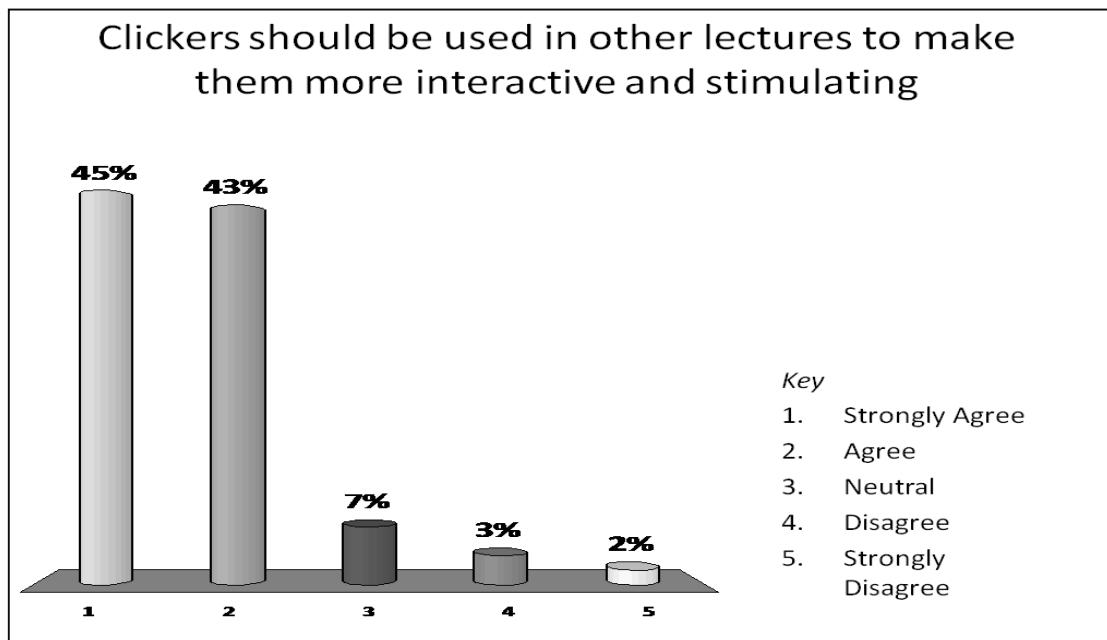
“Used at beginning is a good warm up and brain stimulator, but at the end would benefit me because I could review my understanding immediately. (maybe two short ones).”

“Two quizzes would be good: one at the end testing knowledge and understanding of lecture covered. One at the beginning recapping last week’s lecture.”

5.11 Widespread Adoption

Within the Law School, we continually review our teaching practices, and share experiences in order to enhance the student experience.⁶ Accordingly, as I was the first lecturer in the School to trial this technology, it was appropriate to ask students to consider whether, in their opinion, clicker quizzes should be introduced in other law modules.

Fig 11: Clicker quiz suitability for other modules



(Source: Public Law ‘Clicker Quizzes’ Evaluation Survey, 2010) (n= 62)

A substantial majority of students (88%) of respondents expressed a preference for using clicker quizzes in other subject lectures.

“We only use clickers in Public law, maybe they should be used in all topics. Even those not in law. Fantastic way of learning.”

However, students appreciated that the lecturer has to specifically revise the lecture format to create time for the inclusion of the quizzes:

⁶ e.g. through module evaluation questionnaires, peer review and lunchtime good practice sharing sessions etc.

“Depends on the subject. I found the clicker system quite effective because the lectures are well organised, time wise, to accommodate the clicker quiz. However, I feel this would not be effective in other lectures (time wise) i.e. Land, Criminal because lecturers would have to tighten up their lecture delivery which could lead to a rushed an ineffective lecture.”

6. Conclusions & Recommendations

Overall, this action research study helped me identify potential weakness in my lecturing practice, that is, the lack of opportunity for student interaction and engagement. It allowed me to develop a strategy for improving my teaching practice, namely the introduction of clicker quizzes in order to vary the lecture practice and promote student-lecturer dialogue. I'm pleased to report that the evaluation survey responses indicate high levels of student satisfaction with the use of clicker quizzes in Public law lectures. The student responses indicate that they are useful for recapping key points from the previous lecture and a quick, effective means of providing feedback. The opportunity to receive feedback in this way is appreciated by students for a number of reasons, including the speed of response, the fact that they can monitor their own progress and gauge their performance in comparison to that of their peers. On this basis, I intend to continue using the clicker quizzes in Public law lectures. However, analysis of the survey responses indicates that I should conduct further action research in which I evaluate the effect of implementing a few changes, since O'Brien asserts that:

“action research is “learning by doing” - a group of people identify a problem, do something to resolve it, see how successful their efforts were, and if not satisfied, try again.”(1998)

A future study would consider using the quiz questions throughout the lecture, or else having two quizzes, that is, one at the beginning and one at the end of lectures. Also, one future change in practice that I have identified is the need to develop problems style quiz questions in order to promote peer interaction. I also intend to investigate strategies for recording individual student responses and monitoring performance throughout the course. The ability to link clickers with student users would help eliminate the problem of students removing the clickers from lectures (they are expensive to replace).

On a broader level, the findings from this study are noteworthy in two ways. Firstly, they replicate the positive findings reported by Caldwell (2007) of clicker use across eighteen other disciplines including nursing, communication and philosophy, confirming their beneficial use as a teaching tool. Secondly, they respond to the concerns raised by Easton (2009), that students could become disinterested in using clickers once the ‘novelty factor’ had worn off. Instead, the study findings indicate positive student responses to the use of clicker quizzes or over a prolonged period of time. As for recommending that colleagues incorporate clicker quizzes into their lectures, I concur with Easton (2009) who stated:

“Any extensive use of clicker technology across a law school is reliant upon the belief and commitment of staff members willing to innovate and adapt to benefit fully from the opportunities presented by its use.”

Nevertheless, I advocate the use of clicker quizzes to enhance lecture delivery in both the Law School and other disciplines in order to improve the learning experience of students.

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