

Short Communication

Promoting active learning through ‘pub quizzes’ — a case study at the University of Kent

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Abstract

Several teaching approaches with a focus on active learning have been developed in the past, with the aim to encourage the learner to take responsibility for their own learning progress. Most of these approaches augment the learning of material after it was introduced in conventional lectures. The aim of this project was to develop a teaching method that was suitable for gaining introductory factual knowledge without the need for conventional teaching sessions. A ‘pub quiz’ style teaching approach was developed, which should encourage students to actively engage with a topic in advance of a teaching session and enable students to improve their transferable skills, e.g. learn effective time management and leadership skills.

Keywords: quizzes, assessment, group work

Introduction

The term ‘active learning’ has been used to describe different approaches to make a learner take responsibility for their own learning process (Bonwell and Eison, 1991). The overarching concept behind active learning is the assumption that learners, who actively engage with the material will find it easier to recall information (Bruner, 1961). Although there has been a debate about the nature of how active learning is achieved, e.g. behavioural versus cognitive active learning (Anderson *et al.*, 1998, Mayer, 2004), it has been suggested that “active learning strategies are comparable to lectures for achieving content mastery, but superior to lectures for developing thinking and writing skills” (McKeachie *et al.*, 1986).

Several strategies to engage learners in active learning have been described, e.g. working in pairs, using role-play or case studies (for review see (Bonwell and Eison, 1991)) and quizzes (Willmott, 2001). Turner recently described the benefits of an in-class knowledge quiz, based on the popular television show ‘Who wants to be a Millionaire’, modified to use biology-relevant questions (Turner, 2008).

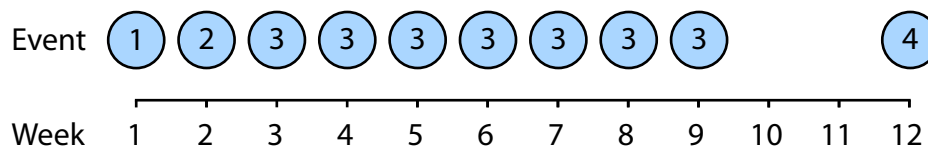
The aim of the project described here was to develop a quiz-style teaching approach to promote the acquisition and retention of factual knowledge through active learning. The sessions were based on the format of a traditional ‘pub quiz’ in which different teams compete against each other to answer factual knowledge or problem-solving questions in an informal atmosphere. The pub quiz sessions replaced the conventional lectures in this part of the module and were not just used as a supplement.

Educational approach

At the beginning of the series of pub quiz sessions students enrolled in a BSc (Hons) in Biology were provided with Powerpoint slides (uploaded in advance on WebCT), containing all the introductory, subject-specific facts of they were expected to know by the end of the module. The

pub quizzes were trailed with two different cohorts of students: a final year group enrolled on a compulsory module on plant physiology and a second year group, enrolled on a compulsory plant classification module.

For the teaching sessions on plant physiology (final year cohort) a series of Powerpoint slides were used. These were provided as a learning resources in conjunction with a Biology textbook (Campbell and Reece, Biology — Media Manager, 6th edition). The publishers were happy to have the slides being made available to students, as long as the textbook was one of the recommended ones on the module reading list and access was restricted to only those students enrolled in this particular module. Students from the second year module (plant classification) were provided (on Web-CT) with a tailored-made set of slides developed by the author. The slides for both cohorts were organised in clearly labelled subsets, e.g. session 1, session 2 etc. The sets for all the sessions were uploaded onto WebCT before teaching on the specific module started (event 1, Fig 1).



- 1 Uploading of teaching slides into VLE
- 2 First teaching session: explanation of format
- 3 Formation of quiz teams, pub quiz, model answers + further explanations, peer-marking
- 4 In-class test

Figure 1 Timeline of events for pub quiz-style teaching

In the first session (event 2, Fig 1) students were told that for the following sessions they had to go through a specified subset of slides and that they would be asked questions about the contents. In the next and subsequent teaching sessions (events 3, Fig 1) students were asked to form small 'pub quiz teams', consisting of no more than 6 members. Teams were asked to work independently, but co-operation within the team was explicitly encouraged. A timed set of questions (usually 1 – 2 minutes per question) related to the slides were presented in these sessions and teams were asked to write down their answers. At the end of the questions, the teams were asked to pass on their answer sheets to a different team. Subsequently, model answers, including further information on the subject, were provided using slides and a whiteboard. Teams were asked to peer-mark the answer sheets using basic marking guidelines given with the model answers. The highest scoring team received a small prize, usually a bag of sweets. An additional incentive to attend the pub quizzes and engage with the topic was informing the students in the first teaching session that some questions from the quizzes would be used in the formal assessment of the learning outcomes at the end of the module. The formal assessment was an in-class test in which the students had to answer 20 short-answer questions related to the material from the pub quizzes within 45 minutes (event 4, Fig 1).

Each teaching session lasted for 50 minutes, with ~20 minutes for the quiz (usually 10 – 15 questions), 25 minutes for the answers and peer marking and 5 minutes for the

'award ceremony'. The setting was a seminar room (for the final year cohort of students) and a conventional lecture theatre (for the second year cohort).

Evaluation

The impact of this approach was evaluated through an anonymous student questionnaire; 27 out of 30 final year students and 15 out of 20 second year students responded. The results of the evaluation forms are shown in table 1.

The analysis of the final year student cohort showed that 86 % of the students agreed or strongly agreed that the pub quiz type teaching encouraged them to engage with the topic more than a conventional lecture would have done. Most (93 %) of the students thought that this approach fostered team-work. Also 93 % agreed or strongly agreed that this type of teaching approach promoted self-study and independent learning. Interestingly, 90 % of the students did not want to miss out on the prize. 79 % thought that the pub quiz style helped them to understand the subject better. Only 28 % of the students thought that this type of teaching did not give as much information as a conventional lecture.

Table 1 Results of evaluation questionnaires of final year group and second year group of students.

Question	Strongly agree or agree (%)		Not sure (%)		Disagree or strongly disagree (%)	
	Final Yr	2 nd Yr	Final Yr	2 nd Yr	Final Yr	2 nd Yr
The pub-quiz type teaching approach forces me to engage with the topic more than a conventional lecture would do.	86	87	7	7	7	6
The pub-quiz type teaching approach fosters team-work.	93	89	7	7	0	4
The pub-quiz type teaching approach does not give as much information as a conventional lecture.	28	20	21	27	51	53
It is more difficult to take good notes in the pub-quiz type teaching than in conventional lectures.	36	43	21	36	43	21
The explanations to the questions were useful and made me understand the topic better.	79	87	11	7	10	6
The pub-quiz type teaching approach requires too much preparation.	18	7	24	21	58	72
There should NOT be a reward for the best pub-quiz team.	0	0	10	7	90	93
With the pub-quiz type teaching approach I am better prepared for tests and exams than with conventional lectures.	79	80	11	7	10	13
Marks for continuous assessment should be awarded to the pub-quiz teams.	11	7	22	38	67	55
The pub-quiz type teaching approach promotes self-study and independent learning.	83	83	7	7	6	7
Overall, the pub-quiz type teaching approach helped me to understand the topic better.	79	73	11	13	10	14

The similarity in the questionnaire responses for both cohorts (table 1) indicates the pub quiz style teaching can be used for different year groups.

Students were invited to comment on their experience a selection of comments are shown below:

“It is a good idea to make students prepare for the lecture stuffs, otherwise they don’t really bother about it”

“The quizzes were good — make a change from sitting & listening”

“Interesting content format — encourages self study”

“The quizzes reminded me of how much I need to revise for the real test”

“It is a good idea, but it somehow doesn’t seem to suit my style of learning”

Distribution of Marks

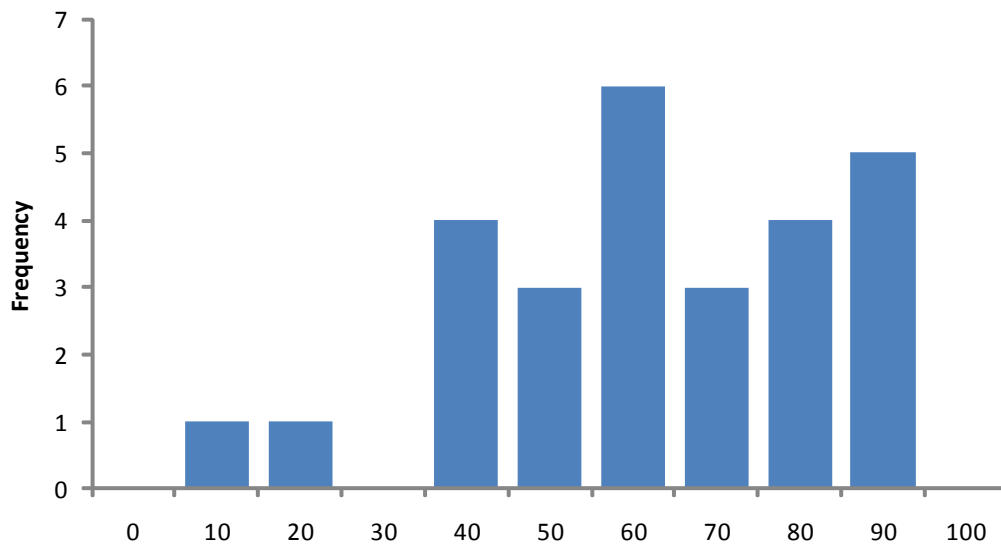


Figure 2 Mark distribution of results from in-class assessment for final year group (plant physiology)

Discussion

The aim of this project was to develop a quiz-based teaching method that could replace conventional lectures in the delivery of introductory material. In the absence of a negative control, i.e. a student cohort taught in a different style, no firm conclusion can be drawn on whether this approach indeed resulted in improved knowledge retention. However, the results of the questionnaires indicated that the students in general felt that this approach was beneficial to them.

The evaluation of the project through a student questionnaire has some limitations. Firstly, the questionnaire was handed out during the final teaching session in both modules. Consequently, only students who attended this session were included in the analysis. Although student attendance in both modules was usually above average, not all students attended every single session. Secondly, pub quizzes are very different to conventional lectures; they are new, unusual — perhaps even exciting. It maybe that the ‘novelty factor’ caused students to rate the teaching higher than it actually deserves i.e. it was rated as good because it was new, not necessarily because it was an excellent way to learn.

A statistical analysis of the results achieved in the in-class test at the end of the module showed a relatively high average mark ($mean = 66.9$) with a good spread of marks ($S.D. = 22.6$). In

this test 18 out of 27 students achieved at least 60% and 9 out of 27 students scored at least 80% indicating that most students achieved the learning objective of this module, i.e. an understanding of specific physiological functions in plants.

In addition the pub quiz-style teaching approach offered a number of other positive aspects for the students and the lecturer:

- It allowed the lecturer to focus on specific aspects of the material, related to their research interests, without compromising on learning outcomes. Teaching on both modules was very much front-loaded by preparing and compiling the appropriate sources. However, once this was accomplished the workload was reduced to preparing the pub quiz questions and model answers. This resulted in a considerable reduction of the overall workload in these modules.
- The peer-marking introduced students to the process (and difficulties) of marking. Students frequently asked for clarification during the marking, e.g. 'should we give a full mark for this answer?'. This active engagement in the marking process helps students to understand, what is expected from them and how this expectation translates into marks.
- Through peer-marking and model answers, instantaneous feedback could be given to students. The benefits of timely and appropriate feedback, however, have been highlighted previously (for example see Higgins *et al.*, (2002) and references therein).
- The quiz itself was a highly interactive process that allowed students to acquire a variety of transferable skills, e.g. discussion, active listening, accepting criticism and developing leadership skills. Furthermore, since students needed to prepare the material in advance they developed their individual learning strategies and time-management.

The pub quiz-style teaching approach is very useful for active engagement of students with factual material. The results of the evaluation questionnaires were very similar for two very different subjects and year groups suggesting this approach is more or less independent of the topic and can be adopted in a variety of other disciplines that rely on factual knowledge. However, from informal discussion it was clear that some students felt that this approach did not best suit their learning style (see final student comment in the evaluation section). It may be useful to explore a 'blended' teaching approach, in which pub quiz-style teaching is combined with conventional lecturing and other approaches.

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References

- Anderson, J. R., Reder, L. M. and Simon, H. (1998) Radical constructivism and cognitive psychology. In D. Ravitch (Ed.) *Brookings papers on education policy 1998*. Washington, DC: Brookings Institute Press.
- Ashcroft, S. and Pereira C. (2003) *Practical Statistics for the Biological Sciences*. Palgrave MacMillan
- Bonwell, C.C. and Eison, J.A. (1991) Active learning: creating excitement in the classroom. ASHE-ERIC Higher Education Report No. 1. The George Washington University. Washington, DC available at <http://www.ntlf.com/html/lib/bib/91-9dig.htm> (accessed 29 June 2009)
- Bruner, J. S. (1961) The act of discovery. *Harvard Educational Review* **31** (1): 21–32
- Campbell, N. A. and Reece, J. B. (2001) *Biology* 6th ed. Publisher: Benjamin Cummings
- Higgins, R., Hartley, P. and Skelton, A. (2002) The conscientious consumer: reconsidering the role of assessment feedback in student learning. *Studies in Higher Education*, **27** (1): 53-60
- Mayer, R. (2004) Should there be a three-strikes rule against pure discovery learning? The case for guided methods of instruction. *American Psychologist* **59** (1): 14–19
- McKeachie, W.J., Pintrich, P.R., Lin, Y.G., and Smith, D.A.F. (1986) Teaching and Learning in the College Classroom: A Review of the Research Literature. Ann Arbor: Regents of The University of Michigan available at http://eric.ed.gov/ERICWebPortal/custom/portlets/recordDetails/detailmini.jsp?_nfpb=true&_ERICExtSearch_SearchValue_0=ED314999&ERICExtSearch_SearchType_0=no&accno=ED314999 (accessed 07 July 2009)
- Turner, I.J. (2008) Who Wants to be a Biologist? An Excellent Quiz Tool for Students. *Bioscience Education*, **11-c1** available at <http://www.bioscience.heacademy.ac.uk/journal/vol11/beej-11-c1.aspx> (accessed 07 July 2009)
- Willmott, C.J.R. (2002) Revision Bingo. *Biochemistry and Molecular Biology Education* **29**, 193-195