SHAPE your CLASS: Improving the Lecture Experience

John Colquhoun, Marie Devlin and Lindsay Marshall
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J. Colquhoun, M. Devlin, L. Marshall

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There are have been many studies of learning style, but little work seems to have been done specifically on teaching style, which is surprising considering how critical a role it plays in the successful communication of knowledge. Defining style is a more subjective process for teaching than for learning, but it is clear that teachers can identify particular traits of other teachers that define the way they work.

We introduce the SHAPE teaching style dimensions and CLASS environment descriptors: constructs that allow teachers to think about their teaching style and to evaluate how it works best in their particular teaching context. We then present the results of a pilot staff and student questionnaire that sets out to gauge the student experience in lectures and teachers thoughts on how their teaching style might impact engagement and attendance at lectures.

The key objectives of the pilot questionnaire were:

- To elicit student views and experiences of teaching quality in lectures.
- To determine whether teaching style has an impact on the student learning experience and teacher approach in lectures.
- To define the environmental and contextual challenges to providing ‘best practice’ teaching in a lecture, as perceived by students and staff.
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About the authors

John Colquhoun has worked in the School of Computing Science since October 2007 initially as a Research Associate, but now as a Teaching Fellow. Prior to that he completed both undergraduate and PhD degrees within the School.

Marie Devlin is a Teaching Fellow for the Centre of Excellence in Teaching and Learning project - Active Learning in Computing. She joined the School of Computing Science at Newcastle in 2005.

Lindsay Marshall received a B.Sc.(Hons) in Computer Science in 1974 from the University of Edinburgh and then studied for his PhD in Computing Science from the University of Newcastle upon Tyne which he was awarded in 1980. Between 1976 and 1980 he worked for the British Ship Research Association in a variety of capacities. He joined the Computing Science Department at the University of Newcastle upon Tyne as a Research Associate in 1980 and whilst working as an RA was responsible for the majority of the development of the Newcastle Connection software. Lindsay was promoted to Senior Lecturer in August 2003.

Suggested keywords

TEACHING STYLE
LEARNING STYLE
DECLINING ATTENDANCE
TEACHING PREFERENCES
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John Colquhoun, Marie Devlin, Lindsay Marshall

Newcastle University, john.colquhoun@ncl.ac.uk, marie.devlin@ncl.ac.uk, lindsay.marshall@ncl.ac.uk

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KEYWORDS
Teaching Style, Learning Style, Declining Attendance, Teaching Preferences
INTRODUCTION
Many HE institutions have faced a worrying drop in lecture attendance in recent years which seems independent of the subject matter or the level of study of the students. In this paper, we review the lecturing model most HE teachers follow today in order to determine if poor attendance is directly related to a lack of engagement and interaction in lectures and if a more student-centred rather than a teacher-centred approach to education can improve the situation. We introduce the SHAPE teaching style dimensions and CLASS environment descriptors: constructs that allow teachers to think about their teaching style and to evaluate how it works best in their particular teaching context. We present the results of a pilot staff and student questionnaire that sets out to gauge the student experience in lectures and teachers thoughts on how their teaching style might impact engagement and attendance at lectures. Our findings show that there are clear mismatches between student and staff expectations regarding participation and optimum learning behaviour in a lecture session and these may be factors that are impacting on student attendance.

BACKGROUND

Declining Lecture Attendance

Many surveys have reported an increasing lack of student engagement, illustrated particularly by a decline in lecture attendance in recent years, such as that provided by Moore et al, (Moore et al, 2008), in which 60% of the students they surveyed gave what was described as “low motivation” reasons for lack of attendance, such as bad weather and a dislike of the lecturer (or their teaching style, for example reading directly from the slides was one particularly unpopular approach) and further noting that the quality of education must also be taken into account by institutions. Another example comes from Massingham and Herrington who conducted a survey of students that examined potential reasons for non-attendance and the impact that it has. Reasons quoted by students in their survey, in addition to lifestyle factors, (such as illness) are very much motivational issues, e.g. liking for the subject and/or the person teaching it and their survey further indicates that these motivational issues are particularly relevant for classes which are not compulsory, (Massingham and Herrington, 2006). The authors go further and suggest that there needs to be a shift in the quality of the learning experience, moving from teacher-centred to student-centred learning approaches, where the students are further engaged by trying to solve realistic, real-world problems.

A similar analysis is provided by Cleary-Holdforth, which includes an in-depth analysis of the literature into lecturing and its teacher-centred approach, (Cleary-Holdforth, 2007). The author notes that the traditional approach in lecturing will not suit all learners, particularly those who are self-directed and who choose not to passively observe. This is because such learners will find the process of sitting and observing information boring. However, Cleary-Holdforth further notes that it is up to those actually presenting lectures to make the process more interesting for the students, for example by introducing more interactivity into classes. Conversely, Clark et al, address the issue...
from an alternative perspective and examine why students choose to attend lectures, (Clark et al, 2010). Their survey examined the impact of attendance on performance, but also asked the participating students why they chose to attend lectures. Some reasons given were: out of a sense of duty e.g., the university may monitor attendance; failing to attend is a waste of tuition fees and that attending lectures may help to obtain more marks in exams. However, the enthusiasm of particular lecturers for their subjects was also a popular reason for attending.

These studies highlight that declining lecture attendance is commonplace regardless of subject or discipline. Some also further note that the style of teaching employed can play a part in poor attendance, with traditional, teacher-centred learning not being well-received by all learners and also that the teaching style of the lecturer(s) can play a part in whether or not students choose to attend classes.

Learning and Teaching Styles
Concerns about the quality of the learning experience of students has also led to a lot of research into recognising how students learn and into finding ways of helping them learn more effectively so as to increase their understanding and engagement with their courses, most notably studies by Kolb and by Felder and Silverman (Kolb, 1984; Felder and Silverman,1988). Kolb’s “Learning Cycle”, which is relatively well known in teaching communities, outlines four stages for effective learning in a continual loop. These stages are “Concrete Experience” (actually having an experience), “Reflective Observation” (reflecting on the experience), “Abstract Conceptualisation” (concluding on the experience and learning from it) and finally “Active Experimentation” (trying out what was learnt). Kolb’s model indicates that learning by watching (e.g. sitting in a traditional, non-interactive lecture) or reading alone is not enough to complete the learning process, but instead that the learners need to actively engage in some activity or experience. Furthermore, the learners should reflect on the material they have learned and consider how to put into practice the ideas they have been taught.

Felder & Silverman’s identified a range of learning styles in which they classify learners according to their learning characteristics and preferences and where they provide, for each category of learner, some advice on how to teach more effectively. Their work notes for engineering, (where their study was based), the categories that most students fell into and the teaching styles best used for these. The authors felt the teaching approaches predominantly used in engineering, (such as auditory, abstract, deductive, passive and sequential), were not best-suited to most engineering students because they found these students’ learning styles and preferences are mostly visual, sensing, inductive and active. Whilst acknowledging that all students learn in a diverse way, a collection of teaching techniques to cover all learning styles are included in the work. These learning styles are again analysed in further detail by Graf et al, (Felder and Silverman, 1988; Graf et al, 2006).

A Gap in the Research
The majority of studies we looked at in our review of the literature on teaching and learning styles focus very much on student characteristics and how students learn, and we believe this is rightly so. Our concern as teachers is primarily for improving student
learning and helping students and so we do want to shift to a more student-centred perspective. The studies we looked at suggest sensible and practical ways in which lecturers can adjust their teaching approaches to become more student-centred, but little work seems to have been done on examining the impact of teacher behaviour on learning or that of teacher characteristics and preferred teaching style, which is surprising when you consider how critical a role teaching plays in the successful communication of knowledge. For example, Felder and Silverman's proposed teaching techniques attempt to help lecturers align their teaching style to the learning styles of students. However, the effectiveness of these in practice has not been evaluated or compared to teacher-centred approaches to a great extent in the subsequent literature and pedagogic research. The teaching techniques outlined focus very much on what the authors learned about students’ perception of information, how students organise information, how they process information, how information can be organised to help them process information more effectively and the mode of ‘presentation’ that suits most learning styles. Other elements of the teaching context that may impact learning effectiveness that are also not examined in these studies nor indeed in the wider pedagogic literature, are the impact of teaching environments and contexts on the student learning experience and the level and type of teacher-'training' that takes place in Higher Education institutions.

Research Motivation

Our problems with the decline in attendance experienced in the School of Computing Science at Newcastle led us to question whether the traditional models of teaching and learning we use are outdated in terms of the needs of our students and to ask whether there are aspects about our teaching approach that need to change. We decided to examine both student and teacher perceptions of teaching approaches used in lectures to see where mismatches may lie. The reason we chose to examine only the lecture experience in this instance is because attendance at our practical sessions is generally higher. Most of our students comment on module questionnaires that they enjoy practical sessions, they enjoy doing the work and that they are not so interested in the theory we teach them but recognise there is still a need for it. Most students also tell us they think practical sessions are the most effective way of helping them learn their subject. Of course, we understand that defining teaching style and style preferences could be a more subjective process than for learning, but, as teachers, we believe we can perhaps all identify with particular traits of other teachers and the way that they work, informally. We also think this might be a good way to start constructing a more rounded view of lecturing activity and experience that can be used to evaluate solutions for improving lecture attendance.

Identifying Preferred Teaching Styles

We wanted to gauge whether there was a common or tacit understanding of what a good teaching style is and to gain some insight into the teaching philosophies and strategies that underpin teaching preferences. We also decided to explore factors of the teaching context and environment which might dictate or constrain teaching and learning approaches adopted e.g. teaching and learning approaches may be physically limited by the nature of a teaching space, the amount of content that needs to be
covered within a time limit, and to ask lecturers and students what effects these factors have on their teaching and learning experiences.

With the help of teaching colleagues from three different schools at the university we constructed a framework of teaching styles, (SHAPE), that teachers could use for understanding and explaining their teaching styles. We also constructed a framework for assessing teacher and student experiences of contextual factors such as teaching space, lecture content and audience characteristics (CLASS). We then constructed two surveys based on these frameworks, one for students and one for staff.

SHAPE Teaching Style Dimensions

The aim of SHAPE is to try to provide a framework in which to think about teaching style by outlining a set of extreme positions against which people can compare themselves. These positions are not intended to be negative or positive reflections on individual teachers and their teaching effectiveness – there are good and bad points for all of the positions. They are meant as a way of helping teachers think more clearly about how they approach the act of teaching. The present set of positions is experimental and may well change as we explore further, but for the moment we believe they provide a good basis for discussion and opinion gathering.

<table>
<thead>
<tr>
<th>Story</th>
<th>Share : You use examples that relate directly to you and your students</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Illustrate : You use examples drawn from standard practice and the literature</td>
</tr>
<tr>
<td>Help</td>
<td>Demonstrate : You show your students how to do something by doing it yourself</td>
</tr>
<tr>
<td></td>
<td>Facilitate : You let your students learn by trying something themselves first</td>
</tr>
<tr>
<td>Act</td>
<td>Entertain : “make ‘em laugh”</td>
</tr>
<tr>
<td></td>
<td>Commentate : “just the facts ma’am”</td>
</tr>
<tr>
<td>Present</td>
<td>Alone : You like to teach solo</td>
</tr>
<tr>
<td></td>
<td>Together : You like to work with others to get ideas across</td>
</tr>
<tr>
<td>Equip</td>
<td>Facebook : you like to use all the technology at your disposal</td>
</tr>
<tr>
<td></td>
<td>Chalkface : you like to keep it simple and direct</td>
</tr>
</tbody>
</table>

Fig. 1. The SHAPE teaching style dimensions

The positions as shown in Figure 1 are:

- Story – where we try to capture how a teacher uses examples in class and the way they relate them to students; The scale of how much a teacher might relate examples ranges from sharing – where lectures share their personal experiences related to the course content to - illustrating – where the teacher describes concepts using known and common examples from standard subject practice.
• Help – where we try to capture the use of practical activities in a lecture setting. The scale of activity type and the teacher’s approach to using practical activities ranges from *demonstrate* – where a teacher might carry out a programming task or draw a diagram to illustrate a concept or how such tasks should be performed to *facilitate* – where students are asked to try an activity first and then the teacher illustrates how a task should be performed according to professional or expected practice.

• Act – This position focuses on teacher behaviour in the lecture e.g. some lecturers are comfortable with using humour to illustrate concepts whereas others are more concerned or comfortable with relating facts in a serious manner i.e. – *just the facts*. This position aims to capture details about a teacher’s teaching personality and characteristics.

• Present – With this position we wanted to find out teacher preferences for teaching solo or co-teaching in a lecture.

• Equip – The final set of positions for SHAPE is Equip, where we are interested in teachers’ use of technology in their lecture i.e. how it is used and also the types of technology that are used.

Some statements that illustrate our thinking for each of the elements of Shape are shown in Fig. 1.

**The CLASS Environment Descriptors**

The aim of the CLASS environment descriptors as shown in Fig. 2 is to help teachers and students define elements of the teaching environment that might have influence on their teaching behaviour and learning experience. With the help of colleagues and student module questionnaires we defined these elements as:

• Content – lecture content e.g. mathematics, legislation, programming concepts;

• Level – level of study the students are at in their degree programme;

• Audience – characteristics, experience, motivation and learning styles;

• Subject – we are interested to find out if Science subject and non-Science subject teaching approaches really do make a difference to teaching and learning experiences;

• Space – the effect of the learning space on teaching approaches and learning experiences.

Sample questions that elicit views on the teaching context are illustrated in Fig 2. e.g. Can students move around and form groups or does fixed seating affect the activities that can be performed?

**Research Methods**

We constructed two surveys using questions using elements from both the SHAPE and CLASS frameworks. The student survey consisted of 13 items that covered a list of their preferred interaction methods in lectures, their feelings about the lecturing experience and their views on teacher behaviour e.g. choices of interaction methods included group work, individual tasks, asking questions and answering questions.
Questions on preferred teacher behaviour included whether they liked the teacher to read slides, relate examples from their own experiences or from standard practice and whether they preferred the use of humour, demonstrations, images, videos or practical examples. The student questionnaire was delivered in paper format during lecture sessions. The staff questionnaire was quite different, in that it was delivered online and consisted of 8 themes including length of teaching experience, their use of time in a lecture and preferred lecture length, their preferred methods of delivery etc. Teachers also had to select tick boxes to indicate their preferences for teaching space, technologies they used and interaction methods they used to engage students during the class. For the purposes and scope of this paper we report on only a few of our findings.

**Results**

We received 164 responses to the student questionnaire, although not all students opted to answer all questions. For the vast majority of questions in our survey, the students could give as many answers as applicable as the options were defined in a list. We also surveyed 20 teaching staff. The students were from Foundation year (year 0) and year 1 and year 2 of our Computing Science and Information courses. We received responses from 20 teachers for the staff survey with varying levels of teaching experience ranging from 1 year to 30 years in higher education. Fig. 3. shows a summary of the results when students were asked their preferred interactive behaviour during a lecture.
Despite the literature into the benefits of interaction in class, the majority of our students selected “passive” options – observing, listening to the lecturer and watching the lecturer demonstrate something (e.g. a piece of code) in class. Students were asked to indicate their preferences for the way in which printed material was distributed and also the amount of content they preferred on lecture slides that were shown in class. The most popular option (127 votes) was to have printed notes that can be added to, as one student noted next to their answer, they like to add to the printed notes with the extra information given by the lecturer during the course of the class. The second most popular option (62 votes) was to have all the module content on the slides – in other words, the entire module content with all of the additional examples on the slides. The two least popular options with 28 and 25 votes respectively were reading notes online after class and reading related material in advance of the lecture, implying that the students are not as interested in reading the material before or after a lecture – though interestingly more students (43 votes) liked looking up other reference sources given in a lecture after the class ended. Most lecturers expected students to take their own notes during the lecture even though the majority of them handed out printed slides with most or all of the relevant content on them (60%, as can be seen in Table 1). There was also a clear mismatch in terms of level of interaction that lecturers expected and students’ responses to their preferred mode of interaction e.g. 95 percent of lecturers said that they asked questions in lectures and 100 percent stated they welcomed questions, (Table 2), but less than 20% of students responded that they felt confident enough to answer or ask questions in a lecture (Fig. 3).

![Fig. 3: Students Interaction Preferences](image)

<table>
<thead>
<tr>
<th>Mode of Interaction</th>
<th>Votes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Full printed slides</td>
<td>60</td>
</tr>
<tr>
<td>Incomplete slides</td>
<td>25</td>
</tr>
<tr>
<td>Additional printed notes</td>
<td>10</td>
</tr>
<tr>
<td>No printed material</td>
<td>10</td>
</tr>
<tr>
<td>Electronic slides</td>
<td>90</td>
</tr>
<tr>
<td>Electronic additional material</td>
<td>55</td>
</tr>
</tbody>
</table>

Table 1: Lecturer use of printed materials in class
We then asked students their preferred teaching approach during lectures (questions 8 and 9). The most popular choice was the use of images and video to illustrate concepts, scoring 93 votes and the least popular choice was lecturers reading from notes and particularly, from the slide, scoring 24 and 20 votes respectively. The use of ‘toy’ examples to illustrate concepts was the third least popular choice receiving 50 votes and in the staff survey 65% of staff responded this was an approach they used. More reassuringly students responded that they preferred the lecturer to relate examples from their own personal experience (81 votes) and 85% of staff responded they used these to illustrate concepts in class, (see Fig. 4).

We asked students what they would really like regarding practical tasks in lectures, (Q9). By far and away the most popular choice here was that students want to be shown something practical in a lecture, gaining 112 votes (approx 70% of those who answered this question). Interestingly, there were 88 votes for students wanting to be guided on the practical assignments, (coursework), for their module during lecture time which is not really the primary purpose of a lecture session. The least popular (46 votes) was for students to try out something practical and then be shown the answer – again enforcing the results from Fig. 3. that students would rather be shown something than participate themselves.

What is clear from our results is that our students were overwhelmingly in favour of lectures as a method of learning, as is shown in Fig. 5, which illustrates the students' overall experience of lectures. The most popular answer was “I prefer to have lectures as well as practicals and tutorials”, with over 100 of our students selecting this option. The second most popular answer was “Lectures are a good way to learn”, with 64 of our students believing this. Conversely, the least two popular answers with six and nine votes respectively were “Lectures are a waste of time” and “Lectures are a poor way to learn.” However, there are also indications that students do have some issues concerning lectures, even those students who are broadly in favour of lectures as a concept. Over a third of our students said they found it difficult to concentrate in a lecture. There were 44 students who said they were too intimidated to ask questions and another 29 who would answer questions anonymously if possible. Furthermore, there were approximately 16% of those who answered this question who said that they often felt lost in lectures and nearly 23% (37 students) who said that they sometimes felt that they were the only ones who did not understand.
Furthermore, there were approximately 16% of those who answered this question who said that they often felt lost in lectures and nearly 23% (37 students) who said that they sometimes felt that they were the only ones who did not understand. The fact that nearly a quarter of our students sometimes felt in this way is a worrying statistic. Therefore, whilst being supportive of the lecture concept, the students do, in general, not have the confidence to interact during the class and sometimes feel that they cannot follow the topic being taught, which may explain the popularity of “passive” options shown in Fig. 3.

**DISCUSSION AND CONCLUSIONS**

Our initial pilot questionnaires helped us to learn that there are clear mismatches between the expectations of staff and students concerning the level of interactivity and participation there should be in lecture sessions. We are almost certain that part of the mismatch can be attributed to students’ natural reticence in asking and answering questions in front of their peers. As lecturers, we may need to devise ways for students to be able to answer and ask questions anonymously. This may help students to feel less intimidated in class and promote greater understanding. At Newcastle we have experimented with Clickers and with live Twitter feeds in lectures recently but these have been small experiments and we may need to do further work on finding ways for students to interact more comfortably. Another way of increasing student confidence
may be to introduce more group activity to answer questions in a lecture so students can interact with their peers and not feel so isolated or intimidated.

We have also learned that lecturer expectations, especially concerning note taking during class, may need to be balanced with the amount of information they distribute on lecture slides and handouts – students can only take notes if there is enough additional information that needs to be noted down. We have also learned that the majority of our students prefer their lectures to be a passive experience, relying on the lecturer to deliver interesting and pertinent content rather than on discussion, group or individual activity or prior reading, note taking etc. Student responses have shown us that we may need to help students learn more about their own learning responsibilities and to give them more motivation and opportunity during a lecture to participate. The staff responses we received have helped us learn more about preferred teaching styles and teacher behaviour in Computing Science and we hope to further explore teacher-reflection and understanding of behaviour and expectations in lectures to improve the learning experience for students. Future work will involve using the SHAPE Teaching Style dimensions and the CLASS environment descriptors in other disciplines to make more comparisons and find out more about Science teaching practices. We also hope to gather more information that will help us further define what teaching approaches make a lecture class successful and how teachers can adapt their teaching style to encourage attendance and engagement in lecture sessions. From this research, we hope to develop an online tool that can be used by teachers in making decisions about their learning and teaching methods for particular teaching sessions.
REFERENCES


