A phenomenography of lecturing

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INTRODUCTION

"At this point, it is unethical to teach any other way"

Clarissa Dirks
Co-chair, US National Academies Scientific Teaching Alliance
quoted in Nature [1]

The above quote was published in a Nature article provocatively entitled "Why we are teaching science wrong, and how to make it right". Its simplicity goes to the heart of the question: after decades of increasing evidence in favour of active learning, why are lectures still the same?

Just as a rigorous research approach is required to understand how to improve student learning outcomes, we also need research about how to reform teaching practice. Some initial steps in this direction have shown that successful pedagogical reforms are long-term, contextualised, and address teachers' beliefs about teaching. It is not enough to put in place overarching policy directives about active learning, nor

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to share best practice, because these do not engage with the particular teaching contexts and beliefs of individual academics.

Professional development programs to shift academics away from the traditional lecture must incorporate academics' conceptions of lecturing. Although there has been some research into conceptions of university teaching in general, there is not any literature focusing in particular on conceptions of lecturing. This paper addresses that gap.

1 BACKGROUND

Traditional didactic instruction has remained the norm since the advent of the university a millennium ago [2]. In recent decades, particularly in STEM (Science, Technology, Engineering, and Mathematics), research has shown that this traditional instruction does little to improve students' conceptual understanding and that student misconceptions are strongly held [3]. Following recognition of the ineffectiveness of didactic instruction has come the development and investigation of alternative teaching strategies, such that now there are a suite of research-based instructional strategies (RBISs) available to the willing teacher [4, 5]. Meta-analyses have shown that these strategies consistently lead to demonstrably better student outcomes, not only in conceptual understanding but also in other ways such as attendance and motivation [2, 6]. However, despite the research evidence in their favour, these strategies are paradoxically the exception rather than the rule in our research-based universities.

This is certainly true of the university lecture, where after hundreds of years the prevalent mode is still the 'sage on the stage', and the implementation of RBISs such as Interactive Lecture Demonstrations or Peer Instruction is comparatively rare. Analysis of successful and unsuccessful attempted reforms of STEM teaching practice has identified several key success factors, one of which is incorporating and/or building on teachers' beliefs about teaching [7]. Many studies have investigated different teachers' different conceptions of teaching, and have almost uniformly identified a one-dimensional spectrum from "teacher-centred/content-oriented" to "student-centred/learning-oriented" [8]. However, these studies have ignored such contextual factors as class size, and it has been recently shown that university teachers think of small classes and large classes in different ways. In particular, most academics take a student-centred approach to small classes, but a teacher-centred approach in large classes [9]. Academics' experiences of large classes, or lectures, have not been studied in detail, and yet arguably this is the most important as it is the strongest bastion against research-based teaching reform.

2 RESEARCH QUESTION

What are the different ways of experiencing lecturing?

3 METHOD

Phenomenography is a qualitative research methodology that investigates the different ways in which people experience a particular phenomenon [10]. The aim of phenomenography is not to understand the phenomenon itself, but the different ways it is experienced by the research participants [11]. Marton [10] uses the terminology of first-order versus second-order to articulate this distinction:

> *From the first-order perspective we aim at describing various aspects of the world and from the second-order perspective … we aim at describing people's experience of various aspects of the world (p. 177).*

From a first-order perspective we investigate some phenomenon in the world, from a second-order perspective (e.g. phenomenography) we investigate people's conception of that phenomenon. Marton offers an example, summarised in *Table 1*, of first- and second-order approaches to the same phenomenon. He points out that the truth, or falsehood, of each answer is independent of the truth status of the other. Likewise, the research methods used to evaluate the truth of these statements, or to investigate the different types of questions, are different. Phenomenography is a research method for investigating second-order questions, as it aims to investigate different understandings of reality [12].

Table 1. First- and second-order perspectives on the same phenomenon

	First-order perspective	**Second-order perspective**
Question	*Why do some people succeed better than others in school?*	*What do people think about why some children succeed better than others in school?*
Possible answer	*The differences in success in school mainly reflect inherited differences in intelligence.*	*There are people who think that the differences in school mainly reflect inherited differences in intelligence.*

Phenomenography is based on variation theory, which posits that out of the multitude of different features of any phenomenon, there is a small key subset of features that are attended to, that are uppermost in people's awareness [13]. However, different people will attend to different combinations of these features, and thus will be aware of the phenomenon in different ways. These different ways of experiencing will be logically related, in that the sets of key features they reflect an awareness of may intersect or be subsets of each other. Thus the outcome of a phenomenographic investigation, in the literature known as the outcome space, is a set of categories of description. These categories of description are the logically-related qualitatively distinct ways of experiencing the phenomenon [14]. Phenomenography is most typically conducted using semi-structured interviews and it is the relationships of meaning between the resulting pool of transcripts that is the focus of the research – both the key similarities, and key differences, in how the phenomenon is experienced [15].

In this study thirty academics from a range of disciplines (approximately half STEM, half non-STEM) from Australian universities were interviewed, using a semi-structured interview protocol, about their experiences of lecturing. The diversity of the sample was purposely maximised by recruiting participants from not only different disciplines, but from different university contexts (urban versus rural; research-focused versus second-tier) and of different genders and experience levels. By such purposeful sampling the diversity of the sample was maximised, with the aim of capturing a rich assortment of experiences. As a consequence however, the results cannot be presumed to be representative of the population of academics at large, nor can any findings, statistical or otherwise, be generalised to other contexts. However, they are transferable, in that they may inform or help make sense of lecturing in other contexts.

Interview transcripts were read, analysed, and categorised, with the goal of identifying a set of qualitatively distinct, logically related, ways of experiencing lecturing. This was an ongoing iterative process of moving between the transcripts

and successive drafts of the categories of description, which has been described elsewhere as cycles of "focusing on developing my descriptions of categories and relationships, and checking these developments against the original transcript data that inspired them" [15] (p. 68). Each successive re-drafting of the categories was a refinement, to iron out inconsistencies between the transcripts and the categories. The endpoint was a set of categories of description that, in the authors' interpretation, captures the critical variation between ways of experiencing lecturing across the collective experiences represented in the whole pool of transcripts.

4 RESULTS

Five different ways of experiencing lecturing were identified:

1. Lecturing as soliloquy
2. Lecturing as connecting meaning
3. Lecturing as cultivating individuals
4. Lecturing as transformatively co-creating
5. Lecturing as enacting research

These are described in the following sub-sections.

4.1 Category 1: *Lecturing as soliloquy*

Lecturing is a one-way interaction between the lecturer and the students, where the lecturer both performs and transfers content.

Key features

The key characteristic of this category is that interaction is only between the lecturer and the students: there is no interaction between students. The role of the lecturer is a combination of transferring content and performing.

In this category the lecture is seen as an efficient device for the expert lecturer to transfer her knowledge to the students. Beyond simply a transfer of information, or 'covering the content', this may also take the form of the lecturer giving an overview or highlighting key points of the topic area. In addition, the lecturer's background experience may be brought to bear to give context to the content through using real-life examples and anecdotes. The category is represented graphically in *Figure 1*, where the lecturer's expertise and background is brought to bear (top arrow) on the interaction with students (2-way arrow).

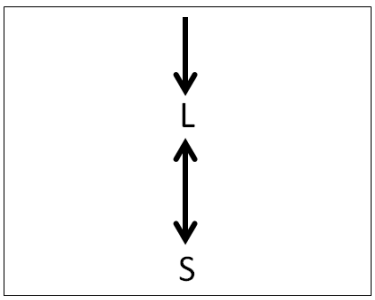

Figure 1 Representation of Category 1: lecturing as soliloquy

The lecture is also seen as an opportunity to perform. This serves two ends:

- to motivate or engage the students, or
- to satisfy the ego of the lecturer.

Despite the term 'soliloquy' strictly speaking meaning a character in a play verbalising their thoughts, I choose this term to capture the essence of this category for two reasons. Firstly, it is a theatrical device and therefore has an element of performance, and secondly it is about one person putting forth their ideas while everyone in the audience listens.

Representative quotes from the interview transcripts

Alan's transcript reflected these dual aspects of performing and transferring content[2]. He talks about how a good lecture builds up his ego by the effective delivery of information into students' heads:

> *if you give a really good lecture, that's way better than a box of anti depressive tablets. I mean you realise you've contributed, you've done something … smashed some information into these dummies' heads that they're going to remember for the next twelve weeks and reproduce in the exam. So [pause] and hopefully what's happened in the delivery of that, you know you've built your own ego and your esteem up in doing that [Alan, p. 27]*

Likewise, Bernice describes both the theatrical aspect and the transfer of information:

> *it's useful, it's practical, you can deliver a lot of stuff to students in a relatively condensed space of time. If there's an aspect to it that I like, it's probably the theatre – you know you actually, I suppose, maybe because I'm a Leo, but you do get to hold, you get to be your own little demi God [Bernice, p. 16]*

4.2 Category 2: *Lecturing as connecting meaning*

> *Lecturing is a process where the lecturer uses interaction to help students make connections between the content and their own experiences, interests, and understanding.*

Key features

The key characteristic of this category is that interaction – both between the lecturer and between the students themselves – is used to help make the content somehow meaningful for the students. In addition to helping make connections between the content and the students, the lecturer's role also includes performing and transferring content.

The lecturer helps students make connections between the content and their own experience through a variety of different strategies. These include asking students to generate their own examples or contexts for which the content is relevant, discussion or problem-solving in small groups, and role play.

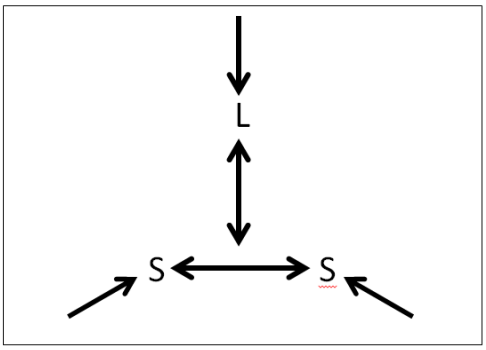

Figure 2 Representation of Category 2: lecturing as connecting meaning

[2] All names are pseudonyms. Page numbers for interviewee quotes refer to page numbers in the transcripts.

This category is represented graphically in *Figure 2*. The one-sided arrows coming in from the outside represent the backgrounds of the lecturer and the students, and how they are brought to bear on the interactions between them. These interactions are represented by the two-sided arrows. The lecturer only acknowledges differences between groups of students, and does not interact with the students as distinct individuals. This is represented in the diagram by the vertical interaction arrow – it does not point differently at the different students.

Representative quotes

The key feature of this category is making connections between the students and the content:

> *I think what you have to do is connect the students to that information [Cadel, p. 17]*
>
> *helping the students put the pieces together in their minds, you know, make those connections I talked about [Nathan, p. 19]*

4.3 Category 3: *Lecturing as cultivating individuals*

> *Lecturing is a process tailored to the individual diversity of students, to develop their perspectives and skills, both personal and professional, motivated by a sense of giving back.*

Key features

The distinguishing characteristic of this category is a focus on the students as individuals. Lecturers go to some effort to find out about the diversity of the students and adapt what they do in the lecture as a consequence.

They cultivate new perspectives in their students, both in students seeing their environment and the content in a new way, but also through students recognising that the different views and ideas of their fellow students are often equally valid. The development of students' personal and professional skills, such as communication, leadership, and teamwork, is a common goal. Lecturers share an altruistic drive to 'give back' for the opportunities they have had.

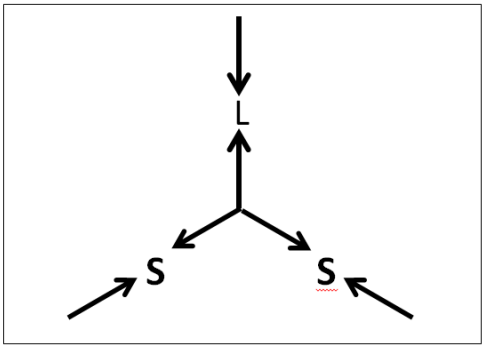

Figure 3 Representation of Category 3: lecturing as cultivating individuals

This category is represented graphically in *Figure 3*. The split arrow going from the lecturer to the different students represents how the lecturer tailors what they do to the individual diversity of the different students. The two S letters (representing the students) are enlarged and in **bold** to signify the lecturers' focus on the students' personal and professional development.

Representative quotes

Lecturers shape what they do to cater to the diversity of their students. For example, Juliet recognises that her students have diverse interests and backgrounds, and may not be as interested in the content as she is, so therefore she has to use a variety of strategies to appeal to them:

> *there's lots of different ways to get such diverse learners. Some of them are artistic, some of them are drama, some of them are really up-to-date with current affairs and politics, and so I'm [pause] you know I've got a diverse group, so I need to try and access the ones that aren't necessarily sciency and think like me [Juliet, p. 30]*

Different approaches and views are recognised as being often equally valid:

> *I think it's good to [pause] for students to know that there's more than one way to solve a problem, there's more than one way to think about the problem, that different people have different thinking styles and they're all valid, even if they're different from yours [Valerie, p. 7]*

Lecturers explicitly seek to develop personal and professional skills. For example, Sam aims to develop a whole spectrum of professional and personal skills:

> *it goes beyond just teaching them material that's relevant to the course, but it also goes into things like learning them- teaching them, sorry, business skills, professional presentation skills, giving them feedback on their assessment that's also relevant in how they can handle different contexts, group dynamics, presentation styles, stress, politics when it actually comes to industry. So it's more about shaping them as people and not just as students [Sam, p. 14]*

4.4 Category 4: *Lecturing as transformatively co-creating*

> *Lecturing is a co-created experience, driven by and building on students and their interests, experiences, and expertise, for the reflective, moral, and ethical transformation of students.*

Key features

There are two key features in this category: co-creation, and personal transformation.

Co-creation means that the experience is driven by the students and the issues and concepts that are meaningful to them. As opposed to the lecturer on the stage performing, the lecturer and students are equals in creating the shared experience. This co-creation is predicated upon purposely building a safe and connected community in the classroom – that is, place-making.

The other key feature of this category is the personal transformation of the students into reflective, moral, and ethical citizens. This is achieved through both targeted activities and deliberate modelling by the lecturer of traits such as integrity, honesty, and professionalism. The best lectures are inspiring.

Co-creation is represented in *Figure 4* by the two-sided arrows between the lecturer and the students, signifying how, on an equal footing, the lecturers and students are bringing their different experiences, interests, and expertise to bear on the interaction between them. The personal transformation of the students is represented by the 'S' characters not only being in bold, but having an extra dimension.

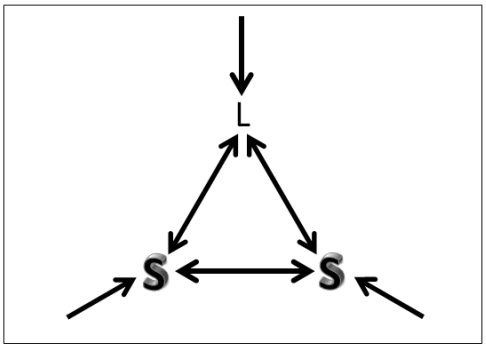

Figure 4 Representation of Category 4: lecturing as transformatively co-creating

Representative quotes

One key feature is that the lecture experience is co-created with the students. For example, Frank describes how the lecture experience stems from student input, knowledge, and experience:

> *So what I really want is their experience, their years of experience and how they would handle given situations, and also [pause] and so this is the wisdom part of the thing. They give back just as much as we get. So it's really co-creation [Frank, p. 14]*

The other key feature of this category is the personal transformation of students. For instance, Kaiser takes his role as a lecturer very seriously, and holds himself accountable for setting a very high standard as a role model of personal and professional behaviour:

> *["can you try to sum up what lecturing means for you? What is lecturing?"] As I've told you, that lecturing is basically [pause] it is on one hand developing the personality of a young man or woman, and the perspectives of knowledge really, because I have always thought it was my duty as a teacher to have a positive influence on my students, not only in terms of teaching. But say for example, honesty, integrity, truthfulness – that the students should also learn these things from me, that I must be honest with them in what I say to them, I must remain committed. There should not be false things coming out of me. So that is one thing which I also, which I attach a lot of importance to because to me, we do not need only good professionals, we need good men and women to build up the societies, and it just not comes through only technical knowledge, it comes through the moral values as well. So this is one thing, that the moral values and the moral values not as through preaching, but through my own example and personality. [Kaiser, p. 15]*

4.5 Category 5: *Lecturing as enacting research*

> *Lecturing is a process in which relevant research is enacted and embedded, towards the goal of personal and social transformation.*

Key features

The key characteristic of this category is that relevant research in such disciplines as sociology, education, and psychology, is deeply embedded and enacted in lecturing practices. Lecturing is a vehicle both for the personal transformation of students and the transformation of society at large.

This category is represented graphically below in *Figure 5*. The external double-headed arrows represent interactions between the lecturer, the students, and the larger context. The lecturer is interacting with the research and enacting it in the interactions with students. The external double-headed arrows anchored with the students represent how they are interacting with and transforming society at large,

and how this is informed by their interactions with other students and with the lecturer. The personal transformation of the students is represented by the 'S' letters having an element of depth and perspective.

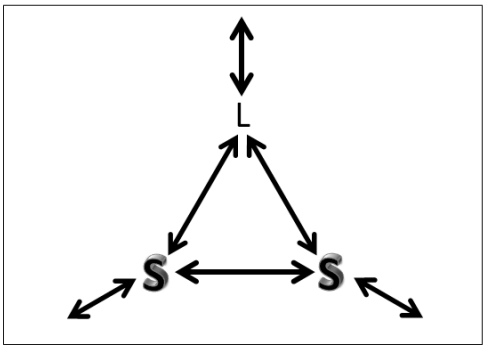

Figure 5 Representation of Category 5: lecturing as enacting research

Representative quotes

Unlike the other categories, there was only one transcript in this category: Mia's. Research underpins Mia's lecturing practice. Her lecturing is informed by research from sociology, pedagogy, psychology, and sustainability. For example, she is very explicit in describing her assessment criteria in lectures because to not do so would mean assessing students on the 'hidden curriculum', a mechanism for social inclusion and exclusion that has been criticised in the sociological literature:

> *my tutor team in the first year course will tell you that I'm spoon feeding, whereas I would argue that when you have criterion referenced assessment, the criterion are what we're assessing them on. If we assess them on anything that's not in the criteria, that would be called hidden curriculum, and hidden curriculum is a cultural practice that's all about social class and inclusion and social reproduction of the higher education community and cohort. It's actually a very dubious social practice. And I think we never really look at this disciplines and go why do our disciplines all look the same decade after decade? But there are social reproduction practices that arrange that. I mean there's a lot of social critique of that [Mia, p. 21]*

Lecturing, and education more broadly, is a vehicle for personal and social transformation:

> *I make no apology that I care about arts, because it's a way of creating a better society, it's a way of broadening knowledge and value for inclusiveness, and I'm proud of that and I advocate for that, and I think that translates very clearly into lecturing [Mia, p. 32]*

4.6 Summary of different ways of experiencing lecturing

These different ways of experiencing lecturing are summarised in *Table 2* below:

Table 2. Ways of experiencing lecturing

Category	Description
1. Lecturing as soliloquy	*Lecturing is a one-way interaction between the lecturer and the students, where the lecturer both performs and transfers content.*
2. Lecturing as connecting meaning	*Lecturing is a process where the lecturer uses interaction to help students make connections between the content and their own experiences, interests, and understanding.*
3. Lecturing as cultivating individuals	*Lecturing is a process tailored to the individual diversity of students, to develop their perspectives and skills, both personal and professional, motivated by a sense of giving back.*
4. Lecturing as transformatively co-creating	*Lecturing is a co-created experience, driven by and building on students and their interests, experiences, and expertise, for the reflective, moral, and ethical transformation of students.*
5. Lecturing as enacting research	*Lecturing is a process in which relevant research is enacted and embedded, towards the goal of personal and social transformation*

In addition, by extrapolation downwards and inference from the transcripts, a lower category was postulated: "Lecturing as reading" – *lecturing is a process of covering the content using a monologue*.

5 CONCLUSION

Traditional lecturing remains the norm in most institutions despite its inadequacies. Successful STEM pedagogical reform must incorporate academics' conceptions of teaching. In this study the focus has been on lecturing, rather than teaching in general. The different ways of experiencing lecturing identified in this study are substantially different to the spectrum of conceptions of teaching previously identified in the literature. These different ways of experiencing lecturing must be considered in professional development programs for lecturers in order to offer the best hope of successful teaching reform.

REFERENCES

1. Waldrop, M.M., *Why we are teaching science wrong, and how to make it right.* Nature, 2015. **523**(7560): p. 272.

2. Freeman, S., et al., *Active learning increases student performance in science, engineering, and mathematics.* Proceedings of the National Academy of Sciences of the United States of America, 2014. **111**(23): p. 8410-8415.

3. Hake, R.R., *Interactive-engagement versus traditional methods: A six-thousand-student survey of mechanics test data for introductory physics courses.* American Journal of Physics, 1998. **66**(1): p. 64-74.

4. Sokoloff, D.R. and R.K. Thornton, *Using interactive lecture demonstrations to create an active learning environment.* The Physics Teacher, 1997. **35**: p. 340-347.

5. Mazur, E., *Peer instruction : a user's manual*. Prentice Hall series in educational innovation. 1997, Upper Saddle River, N.J.: Prentice Hall. xv, 253 p.

6. Prince, M., *Does Active Learning Work? A Review of the Research.* Journal of Engineering Education, 2004. **93**(3): p. 223-231.

7. Henderson, C., A. Beach, and N. Finkelstein, *Facilitating change in undergraduate STEM instructional practices: An analytic review of the literature.* Journal of Research in Science Teaching, 2011. **48**: p. 952-984.

8. Kember, D., *A reconceptualisation of the research into university academics' conceptions of teaching.* Learning and Instruction, 1997. **7**(3): p. 255-275.

9. Daniel, S., A.P. Mazzolini, and L. Mann, *Contextual categorisation of academics' conceptions of teaching.* Scientia in Educatione [accepted], 2014.

10. Marton, F., *Phenomenography — Describing conceptions of the world around us.* Instructional Science, 1981. **10**(2): p. 177-200.

11. Marton, F. and S. Booth, *Learning and awareness*, ed. S. Booth. 1997, Mahwah, N.J.: Mahwah, N.J. : L. Erlbaum Associates.

12. Marton, F., *Phenomenography - A Research approach to investigating different understandings of reality.* Journal of Thought, 1986. **21**(3): p. 28-49.

13. Bussey, T.J., M. Orgill, and K.J. Crippen, *Variation theory: A theory of learning and a useful theoretical framework for chemical education research.* Chemistry Education Research and Practice, 2013. **14**(1): p. 9-22.

14. Åkerlind, G.L.S., *Growing and Developing as an Academic - Implications for academic development, academia and academic work*. 2003, University of Sydney: Sydney. p. 203.

15. Åkerlind, G., *Learning about Phenomenography: Interviewing, Data Analysis and the Qualitative Research Paradigm*, in *Doing Developmental Phenomenography*, J.A. Bowden and P. Green, Editors. 2005, RMIT University Press: Melbourne. p. 63-73.