

PRE-LECTURE ACTIVITIES (Professors)

Academic Listening – Lecture Participation

In undergraduate programs students habitually attend lectures without preparing in advance and are often overwhelmed with the quantity of new material they are being taught. Furthermore, instructors often teach new materials without the proper activation of students' prior knowledge and key ideas. These day to day challenges can be tackled by incorporating pre-lecture activities, where students complete some work before the lecture session with a view to familiarising themselves with core concepts and prepare the mind of the learner.

Pre-lecture activities are helpful for both teachers and students in a variety of ways. First, students can identify misconceptions and habituate to the lecture material. Secondly, teachers can focus on deeper and broader discussion with students that lead to knowledge construction more than a simple overview of the material. Lastly, students who feel more confident in their knowledge are more willing to participate and engage actively in class activities.

This article provides teachers with pre-lecture activities they can incorporate into their courses taking into account both the theory and the practice.

The essential pedagogy of pre-lecture activities is grounded in cognitive load theory as learners are exposed to new information, they process what they see and hear in the working memory. The amount of information – called the cognitive load – that can be processed is limited, and depends on the learner's prior knowledge. The more a learner knows about a subject, the easier it is to assimilate the newly acquired information into the long-term memory. Cognitive load theory provides a basis for describing how much new information should be presented (intrinsic load) and how this is presented (extraneous load) so that there is capacity for learning (germane load) to take place. For learners new to a topic or discipline, reducing the amount of new information presented in any single learning situation and presenting the information clearly, leaves more capacity for learning.

Cognitive load theory Seery and Donnelly (2011)

Cognitive load describes the capacity for learners to process new information in the working memory. Three types of cognitive load are identified:

- Intrinsic load is caused by the unfamiliarity and/or complexity of the material. This depends on the level of expertise of the learner – the extent of their prior knowledge.
- Extraneous load depends on the quality or nature of the instructional materials. Poor materials or those that require a large amount of working memory to process will increase the load and leave little capacity for learning.
- Germane load is the mental effort required for learning. Due to the limited capacity of the working memory, the capacity to process germane load (the extent of learning) will depend on the level of intrinsic and extraneous load.



Categorising pre-lecture activities

Two scenarios are outlined in table 1 which represent ends of a spectrum of the type of pre-lecture activities that can be incorporated into teaching. At one end, preparatory pre-lecture activities are used to provide learners with an overview of some of the core concepts of a lecture. The lecture itself remains relatively unchanged, save for occasional references to what was presented in the pre-lecture activity. The aim is to reduce some of the in-class intrinsic load by presenting students with some key concepts in advance. It is a low-risk strategy for all concerned – students who do not complete the activity will still have the core content of what was delivered in the lecture, although they may struggle with the pace if the lecturer is assuming some basic principles have been addressed in advance. For lecturers, it requires, in principle, little change in the lecture, and therefore little work beyond preparing the pre-lecture activity. However, in practice, it has been found that when armed with some core terminology/ principles on arriving at the lecture, students are more likely to ask questions based around their understanding of topics, and the nature of the lecture tends to become more discussion-based.

This concept of making lectures more discussion-based leads to a second category: content-covering pre-lecture activities. In this case, students cover a significant portion of lecture material in their own time in advance of the lecture. The lecture hour is devoted to discussing this content in greater detail or dealing with problems or misunderstandings. This concept is grounded in cognitive load theory, and is the basis

of an emerging trend called ‘flipping/ inverting the classroom’, whereby students do work that was traditionally done in a lecture in their own time, and work that was traditionally done as homework in class time. By requiring so much of students in advance, this approach is high-risk, in that there is a substantial demand on the learner to cover a required amount of material before class. It is also more demanding for lecturers, as the structure of the lecture is now more vague. In principle, students could request to discuss any aspect of the content they did not understand. In practice, structured in-class work can be used, along the lines of a tutorial.

These two scenarios represent extreme ends of a spectrum of possibilities for pre-lecture activities, and it is likely that most lecturers considering their use will initially opt for something in between. Whichever approach is taken, it is likely to be more effective if you can link it to some prior knowledge the students are likely to have. The lecturer should be clear about what is required of the pre-lecture activity and how it will be used in the lecture. Once this is clear, the assessment of the pre-lecture work can be established.

	Preparatory pre-lecture activities	Content-covering pre-lecture activities
Description	One or two core principles upon which the lecture depends are explained	All topics of a lecture are presented in advance of the lecture.
Assessment	Pre-lecture quiz which checks understanding of these core principles or other expected prior knowledge. It is important to focus on what you want the students to know before the lecture, not afterwards.	Pre-lecture quiz – bespoke examples in the literature embed these in the delivery of the pre-lecture activity so that students can check their understanding as they progress. Questions/discussions at the beginning of class (clicker questions are also possible).
Use in lecture	Lecture delivered as usual, with references to pre-lecture activities or perhaps building on pre-lecture activities.	Lecture becomes more like a tutorial, discussing core principles, problem solving, group work
Advantage	Evidence shows that this approach does reduce cognitive load in the lecture without the requirement to significantly alter the lecture format	Class contact time becomes a much more active learning environment based on discussion and problem solving.
Disadvantage	Time consuming – deciding on the right amount of information to present in advance so that it provides enough information to prepare students for lectures and that students consider it worthwhile, but not so much	Large workload in creating pre-lecture activities and concern that some students may not engage or like to be assessed on material that they ‘have not been taught’.

	that it overwhelms a novice learner.	
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Activities

Online discussion assignments

You can use your e-aulas platform to post a forum where students can participate clarifying concepts and construct knowledge with others.

Pre-lecture quizzes

Kahoot is a good example to be used in classrooms, you can use it as individuals or teams, its colourful platform provides a fun environment to check knowledge and encourage competence towards students.

Slides (power point, prezi)

Pre-lecture activities can be as simple as posting a few animated slides that present new terminology or introduce students to complex concepts. The lecture slides can be accompanied by a short multiple-choice quiz to assess student understanding and provide incentive for student completion.

References

<http://www.rsc.org/learn-chemistry/resource/res00001396/using-pre-lecture-activities?cmpid=CMP00003311>