# **Designing Open Book Exams**

**Manish Malik**, School of Energy and Electronic Engineering, University of Portsmouth - [manish.malik@port.ac.uk](mailto:manish.malik@port.ac.uk)

Manish shared, via the SEDA pandemic resources, his [guidance on designing open book exams](https://docs.google.com/document/d/1lptT2cRXEhdIBWaAv9qdeYZPPEYog1Am1K-xESGaGBk/edit) based on research papers reviewed for this purpose - targeting home based open book exams as opposed to “cheat sheet” type open book exams used within classrooms / proctored.

One of the key things to consider in open book exams is that it focuses on reasoning, conceptualisation and problem solving. Testing factual knowledge that is at the end of a google search should be avoided.

## Multi-choice questions and Open book exams.

Using multi-choice questions that invoke reasoning, for example where there are options that present a cognitive conflict in the minds of the students can help differentiate someone who simply is googling for an answer or someone who can use reasoning to eliminate some of the options.

Another thing to consider when writing these multi-choice questions is that they have rich context, i.e., the question requires students to use several data points from say a figure, table, graph, etc. or within the question that makes it specific such that students are not able to just google the answer (Cade et al., 2018). The key is to make them use the information as opposed to memorising or referring to it.

## Designing questions that have open text answer in Open book exams.

Here too, making the context rich would reduce the possibility of a quick google search to come up with an answer. Selecting a scenario and asking the students to identify the problem in the scenario, identifying ways to address the problem through researching, choosing one solution that they think would be best suited for the problem and suggesting implementation plan for it and stating test procedures and plans to evaluate the solution with the users of the technical solution will allow assessing their learning and critical skills as opposed to recall and retrieving information on the web.

## Using calculation-based questions in Open book exams.

When responding electronically, it may be tricky for students to write complex equations and show step by step working when solving multi-variable equations to work out values of target variables asked in the exam question. Particularly, when they have limited time to answer the questions if they are being asked to submit handwritten solutions electronically by scanning handwritten solutions. In such cases, a solution here could be to use [Blackboard short answer questions](https://telhelp.shu.ac.uk/different-question-types-available-blackboard) to get the students to type in the answers but provide them with a numbered and exhaustive formulae sheet. By asking them to state which equation number, from the formulae sheet, they are using to work out the value of a target variable and state the values they used for the variables in the equation, that they know from the question or worked out in a previous step, would allow them to show the input and the output as well as the selection of the correct equation for solving the question. This way they can just type in the text box their answers to complex calculations without the need to show all the steps and write out difficult/lengthy equations or having to scan handwritten answers.

Students may be a bit apprehensive about this, so allowing them to do a mock test and giving generic feedback on common problems and approaches students take will help here. Drawing diagrams is also not possible in this method and it should be kept in mind.

## Differences between ‘in class with a cheat sheet’ and ‘at home’ open book exams.

Some prefer the “Cheat sheet” approach to open book exams but that is more relevant when we have face to face exams in a classroom. Here students are asked to organise a 1 or 2 page “cheat sheet” which they can use in the exams. In the current coronavirus situation, the cheat sheet becomes the entire internet with the additional ability to search it as they will take the exam “at home”. Therefore, there is little to be gained in assuming this style of open book exams unless it uses the same principles as above in addition to the cheat sheet approach.

## False sense of confidence in students and other challenges with Open book exams.

Studies suggest that the term open book exam makes students feel less anxious about the exam as they tend to believe that they will be able to do well with all the knowledge available to them. They will spend up to 33% less time preparing for these exams. They may also spend more time looking for answers than formulating one.

## Strategies to increase difficulty and limit cheating.

* Students can work only one question at a time and cannot access completed questions.
* Limit the period in which the exam should be submitted to 60% more than a normal closed book exam.
* Random number generator used in MCQs.