

# The use of open-book examinations to motivate students: a case study from Hong Kong

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**ABSTRACT:** Open-book examinations are believed to be able to reduce students' anxiety and rote memorising of facts. However, in cultures where prescriptive teaching dominates, open-book examinations may need to be accompanied with changes in lecturing methodologies and better preparation for individual's critical thinking. The purpose of this study is to assess what preparations students have undertaken before taking open-book examinations and what learning style they adopted during the preparation of this non-traditional approach to subject testing. The methodology chosen was to interview 10 students who had no open-book examination experience before. They had their first trial a week before the interview. The results indicated that, although students had a positive perception towards open-book examinations, the preparation needed and the processing of information read in order to answer the examination questions were relatively minimal. Students appeared to need more guidance as to how they would be assessed and more trained on critical thinking.

## INTRODUCTION

Examination is a feedback mechanism for both teachers and students. Closed book examination is an established procedure in traditional assessment. The major purpose of assessment often refers to the rating of students' abilities, but it is also an exercise to obtain students' feedback. Assessment also reflects information on teaching and learning effectiveness. Such information is of particular importance to students and teachers. Open-book examination is believed to be able to encourage deeper learning [1]. It is also hoped that open-book assessment could have a powerful contribution to teaching and learning at higher taxonomical levels [2]. This article is based on an analysis of an interview.

Early studies on open-book examinations can be dated back to Stalnaker and Stalnaker's research in the 1930s [3]. Following this research, both Tussing and Boniface focused on the arrangement of open-book examination [4][5]. These studies aimed to investigate two major issues. The first study was the difference in students' achievements between working in an open-book setting and in a closed book setting; when the examinations were designed to address critical thinking and higher-order skills, it was reflected in their learning approach. The second one was the learning goal in open-book examinations. Students focused on the processes of the events, rather than the consequences and facts.

## SURVEY ON STUDENTS' LEARNING STYLES

This study employed qualitative research techniques to investigate how open-book examinations can encourage critical thinking. In order to collect in-depth information from students, a semi-structured interview was conducted to gather information. An interview is defined as a collection of data through direct verbal interaction between individuals [6]. It is

the appropriate research tool when direct face-to-face contact with persons is imperative or immediate responses are desirable. It is also suitable for a relatively small sample size and is frequently used to generate standardised qualitative data that is not subjected to statistical analysis.

Interviews are categorised in relation to their nature, structured and unstructured sections. The so-called structured interview typically looks for generalised, statistically reliable data while an unstructured or loosely structured interview seeks depth and detail for a much smaller number of cases. The aim of the interview in this study was to flesh out how and what students learned in the arrangement of an open-book examination.

## Interview Subjects

Ten sophomores were interviewed about their experiences. Their perceptions on how learning had occurred and how helpful they found the various learning processes in which they had involved were points of interest. A semi-structured interviewing method was preferred because it could provide a certain amount of free interaction between the researcher and participants with provision for either side to seek clarification at any point. This method of interviewing provides an excellent opportunity to test propositions on students by offering those interpretations that they may choose to either clarify or explain in detail [7]. The inclusion of a number of open-ended questions gave students greater latitude in terms of the way that they framed their answers, but it was intended that both the sequence and wording of the questions could be presented by the researcher.

The advantages of an interview over other research tools, such as a questionnaire, are the flexibility to deviate from the set questions if the need arises and the ability to probe areas of interest or vagueness, instead of relying on routine responses.

## Interview Procedure

The interview was carried out with explicit definitions of the two distinct examination alternatives. Students gathered in the examination venue and were seated separately. They had to spend a definite period of time answering questions without consulting their classmates or referring to any other resources, eg books or computers. This format of assessment is often called a *closed book examination*. A more common name is a *conventional examination*. A major difference of an *open book examination* is that students are allowed to take any written material or designated material with them into the examination and refer to them.

## Interview Structure

The interview was divided into three sections. The first part has questions that focused on the learning approaches before the examination. The second part targeted how they answered the examination questions. The key areas to be investigated were as follows:

- How many books or materials did they refer to?
- Did they frequently paraphrase reference books or materials that they brought into the venue?
- How was their feeling about the examination? Was it different from a closed book examination? .

The last part of the interview included open-ended questions relating to their opinion on open-book examinations. Students were asked to fill in a demographic data form, as well as write down their experiences in an open-book examination. They were also asked how they prepared and studied before the examination.

## RESULTS

A narrative style was utilised for reporting the findings, which drew essentially on the reproduced versions of the students' own words for content. Because of confidentiality, all quotations were recorded in isolation and not linked with other materials contributed by the same student. Similar answers were grouped together and reported anonymously. Only those important to the study are reproduced here.

Question 1 asked *What is your decisive factor to selecting the types of questions in an examination?* This drew the following answers:

- *I shall use a few minutes to understand the examination questions and select the one that I have learnt more.*
- *I shall make a choice after I have read through all the examination questions.*
- *I won't choose the questions because I have my own favourite already!*
- *I shall use a few minutes to assimilate the examination questions and select the one from which I can get a higher performance.*

Question 2 asked *When you do a revision, do you have any principles to select the topic for reviewing?* This elicited the following answers:

- *I have my own strategy to do a revision.*
- *Yes, but I need to make the decision during the revision.*

- *I shall select the topic that I'm keen on. Besides, I shall assess whether these topics are adequate to answer the examination questions.*

Question 3 sought responses to *Do you borrow reference books and additional materials in your revision?* This received the following answers:

- *Yes, I am afraid that the materials in the textbooks are not sufficient.*
- *Yes, I shall read supplementary reference materials to enrich my knowledge, although I can't digest all the materials in the reference resources.*
- *I won't borrow any material. There is no difference!*

Question 4 asked *What are the benefits of an open book examination?* This drew the following responses:

- *As I am required to find reference materials, I need to read the syllabus clearly and carry out a comparison between the textbooks and the reference materials. Afterwards, I shall prepare a synopsis to list the important points of the taught areas and get a full picture of each topic.*
- *No need to memorise all the stuff.*
- *We have to understand the syllabus and the content fully.*

Question 5 inquired *What do you think about using four pages of cheating paper in an examination?* To this, the surveyed students gave the following responses:

- *The students need to read through all the teaching materials at the beginning, make a judgement to emphasise the important issues or key points before preparing the four papers. Virtually, the student has performed a coarse revision before the examination.*
- *I shall try my best to write down all the equations on the papers as it is very difficult for me to memorise the equations. Afterwards, I shall read through the textbooks and write down the important notes. Therefore, I am required to begin the revision as early as I can.*
- *I shall make a judgement after I have done the revision.*
- *I shall make a choice after I have read through the past papers and the textbooks.*
- *I shall read through the syllabus carefully to differentiate between the examination questions and select the topics to revise.*

Question 6 queried *What do you think about open-book examinations?* The answers included the following:

- *It can help me to reduce the stress. I can pay more attention in revising and in digesting the materials instead of memorising teaching materials. I can absorb the content and have sufficient time to revise the materials.*
- *It can reduce the stress, but the approach of the examination questions is not straightforward. I need to read more reference materials before the examination.*
- *Not to be very useful, but I feel it is better than a closed book examination.*

Question (7) asked *How did you do your revision?* This received the following answers:

- *I tried my best to understand the steps in answering the questions. I don't need to memorise the steps as the examination questions are not the same.*
- *I shall borrow the problem solving reference books as the worked examples can assist me to learn more.*

## DISCUSSION

The results from the interview indicated that all students had attended an open-book examination at least once. Most students found it difficult to look for studying materials. This was as a result from a lack of advice from teachers and training. Eight out of ten students expected that an open-book examination would be easier. The reason for this was that no memorisation was required.

### Initial Preparation

Students believed that the traditional learning strategy of spotting and memorising books would not work for open-book examinations. Practising applications was far more important than any other approach. The open-book examination, as perceived by the students surveyed, seemed to serve the field applications of theory. They would try to look at the relationship of real life cases for most of the engineering problems.

In their preparation, students tended to rigidly define the scope of work first. They had made a list of textbooks in the library with worked examples of different categories, eg conduction, convection and radiation for the subject *Heat Transfer*. Students utilised not only the recommended materials, but also searched for some specific problem solving textbook, eg *100 problems in Heat Transfer*.

Some students re-arranged the materials given to them by their lecturers and put them into a *condensed version*. They agreed that it was very useful for them to have a better understanding of the subjects, but it was quite often a lack of advice from the teachers. Upon completing the revision, students had to make four pieces of A4 paper for use in an open-book examination. Students felt that it further enhanced their understanding of the topics.

### Process in Examination

During the examination, students spent about 10-15 minutes to read the questions. However, most of them already had their preferences identified beforehand. They spent another 10 minutes looking for relevant materials. Most of them started the search from handouts to others. This showed an agreement with another survey [8]. Students believed that handouts are the first materials they should refer to. Although they brought several textbooks into the venue, they often referred to the handouts and one or two textbooks.

The researcher had asked them *Did you read or revise those unused books?* Most of them replied that they did read some chapters at the early stage of screening, but they did not undertake an in-depth study of those books.

### Purpose of the Study

The overall purpose of the study was to identify the learning behaviour in closed book and open-book examinations. With reference to the stages of preparing and taking the examination,

the results suggested that students' study behaviour varied according to examination settings.

In the preparation stage, the major change involved the number of study materials. Students borrowed or bought at least two additional books for reference. It appeared that in studying for a closed book examination, the effort was centred mainly on collecting and memorising information from teachers' handouts and textbooks. They would follow the same procedures and approaches that they had learned in their lectures. In the open-book examination, students had to decide what materials they should take along. This required an in-depth study of the syllabus. The number of books borrowed has increased. During the examination, students re-organised what they had to write on the answer book. They also had a better understanding of past examination questions.

The majority of students held a positive view towards open-book examinations since they were not required to memorise unnecessary stuff that was readily available at anytime, eg standards or handbooks. Students could save their precious time doing critical thinking and evaluating their knowledge. It enabled the promotion of deep learning. The stress of students was also reduced a great deal because they had a common anxiety of *too much to memorise and too easy to forget*.

It was also noted that an open-book examination does encourage deep learning on its own. This is because no marks were given for paraphrasing, which was a common problem for all students and teachers. However, students also expressed their concern with regard to teaching and learning interaction. There was not enough practice for them to be familiar with these kinds of questions. Overall reviewing, open-book examinations resemble more of a friend more than a foe with regard to a deep learning approach.

## CONCLUSIONS

Open-book examinations are nothing new, but they are not commonly used in Hong Kong. It was firstly introduced to Hong Kong in 1935 [3]. Open-book examinations can test students' mastery of knowledge on how well they are able to apply theories to new information. This is analogous to a *relational and extended abstract* of SOLO taxonomy [9]. It encourages thinking at higher cognitive levels rather than in a spoon-fed style.

Students' perception about open-book examinations may lead to less preparation. Teachers should explain clearly what assessment criteria would be applied. It requires the ability to apply and extend a sound knowledge base. Marks should be awarded to a critical analysis of questions and rational answers only. Irrelevant answers should not gain any credit.

The present study also compared results with another study [10]. There were some interesting findings. The first one was covered the application of reference materials. Most students borrowed some books with worked examples, which were not of a conventional type. Those books focused on practical applications of engineering problems. There was not much emphasis on background illustrations. The second finding was that students had preferences for some types of questions in some particular areas that they felt that they were strong in or had an interest in.

Teaching and learning requires higher order thinking and critical analysis, such as reasoning, conceptualising and problem solving techniques [11]. Open-book examinations could reduce the stress and anxiety of students. The proposition was firstly suggested in Feller's study [12].

Some students shared similar views; they had borrowed a number of *worked examples* textbooks. This would lead to a bias in studying attitude.

In conclusion, the results of the study suggest that two factors greatly affect students' learning process, as follows:

- In the way that students are assessed: Students already expressed their concern regarding question types and the marking scheme of examinations;
- The manner of learning: Students felt that seminars and open discussions are useful for learning from different perspectives.

It is a common understanding that teaching and learning must address course objectives. Course objectives must support students to learn and be aware of what and how to learn. Thus, students should be advised of the standards of assessment at the very beginning of their lessons.

The message of *critical thinking* must be always reiterated. Students should be encouraged to give alternative solutions. There is no unique solution, but often logical ones.

Students should also be encouraged to actively participate in different kinds of learning activities, eg seminars and project-based work.

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