Effective Case-based Learning Strategies

Case-writing
There were plenty of suggestions on how to write good case materials that can facilitate teaching and learning in science education. The key points include:

1) Selection of good case stories
2) Provision of the right amount of guidelines
3) Preparation of students before case-based teaching
4) Assessment methods should match the learning objectives

Selection of good case stories
- A case should be a real story or based on real stories. Student will be less devoted to imagined situations.
- An adequate amount of scientific concepts should be covered by the case. Students should be able to learn new concepts through the cases.
- Cases can be represented in different formats. It is best if it can be visually attractive: videos, more figures and diagrams.
- Teachers should be flexible about which parts of the case are required based on students’ abilities.
- More difficult questions or tasks can also be included in the case as ‘further or optional activities’ for the more-able students.
- Graphical representations of concepts (such as concepts maps) can be included to help students understand concepts and relations between concepts.
- If possible, it is beneficial to develop different versions of a case to cater the needs of students of different interests and levels. Some students may prefer cases with heavy subject content, and the other may prefer cases that can facilitate the development of multiple intelligences based on common sense, with less reliance on specific subject knowledge.

Provision of the right amount of guidelines
- Useful web links can be provided for students to start off the information searching task by students. The listing, however, should not be comprehensive as it is certainly more encouraging for students if they find out useful information by themselves.
- More guidance should be given to enable students to handle all the learning activities: e.g. to conduct online information search, group discussion, and presentation activities on their own.
- If possible, teachers should give guidance to different students according to their abilities. Low ability student may need more help and instructions on knowledge and/or skills.
- Teachers need guidance too. Instructions should suggest how the activities can be divided up so that they can be implemented in the teaching blocks that are roughly about 40 minutes each. It is done to suit the secondary school setting.
More time should be allocated to case-based activities. Time allocation should be clearly indicated on the case materials.

Other tips to teachers can be given in the text. For example, when implementing the case-based methods, it may be a good strategy to mix students with various backgrounds and levels. It is observed, for example, that S6 students can play a very active role in helping S5 students to understand the scientific concepts that are essential in analyzing a case. The strategy can facilitate the development of students’ generic skills and the sense of collaborative learning.

Preparation of students before case-based teaching

- The pre-requisite of the cases should be clearly indicated to help teachers select activities that can best benefit their students.
- Background information about CBL can be given to teachers: rationale and benefits of the approach, useful teaching techniques, and other background information.
- Teachers can then use some of the materials to prepare students for better acceptance of the new approach.

Assessment methods should match the learning objectives

- The case should state clearly how students’ performance is to be graded.
- Such assessment methods should not just test students’ remembering of facts or basic understanding of knowledge as it is not case-based teaching is mainly about. On the contrary, case-based assessments should be able to accredit students if they can apply knowledge, solve problems, and manage the learning processes well.
- Teachers should not be the only source of comments and grades. Peer assessment can be implemented to enable students to be more critical about their own work.

Case-based teaching

There were also suggestions on how to make case-based teaching successful in its actual implementation.

1) Teachers should be ready to assume a new role in the classroom.
2) There are also skills that teachers have to be acquainted with which include providing timely assistance to students, and managing the structure of the activities in the most effective manner.
3) Good school resources and facilities are needed to back up case-based learning.

Teacher responsibilities and roles

- Teacher should feel comfortable about not to teach too much. Unlike the traditional teacher, case-based teacher may teach the basics and leave the extensions of the basics to the students to explore themselves.
Teachers should give direction to students who cannot figure out what's happening. However, concrete suggestions are prevented to leave a space for student to think by themselves.

Teachers give individualized support to students in case-based classes. They should offer help according to students’ abilities. Advanced students can handle the task themselves. But be careful of those students who have low incentive to learn. Don’t leave them out – pay more attention to them.

Teachers should feedback on students’ performance more regularly than traditional classes. For example, constructive concluding remarks should be given right after students have their presentations or submissions of work. Sometimes, remarks and feedback can come from the peers and teachers' new role is to encourage peer critique.

Unlike teachers in traditional classes, case-based teachers also need to care about how well students can learn. It may be the first time for students to do group work in school. They may not be good at doing online information searching. They may not be able to work collaboratively. They may be too shy to discuss or to allocate responsibilities to members in a group. Teachers are advisers on learning skills as well.

**Classroom skills**

- Student preferred a short but clear introduction from teachers. More time should be given to students to work on their own: to search for information, discussion and preparing presentations.
- Teachers should be careful in controlling time. Don’t overrun the schedule. At the same time, be flexible to adjust the timing.
- Allow sufficient time to allow students gain deep understanding of the content through discussion and interaction. Too tight a schedule will have adverse effect to students learning.
- Teachers should clearly state the class rules and all the other regulations before all activities to gain the cooperation with students to ensure a smooth teaching process.

**Facilities and resources**

- Better facilities are needed in CBL, for example, a computer lab to provide student with a computer to search information.
- More teaching staff are also needed to make case-based lessons work well. A small class size is good. Also, it is also helpful if there are teaching assistants in the classroom to closely monitor activities in each group.
- A class size about 20 is preferred. The other advantage of a small class is that every student will have the chance to participate in discussion and presentation.