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Chapter 4 Final Teaching Report

Teaching can be regarded as a process of transmitting knowledge or a process of facilitating learning (Biggs, 2001). Whatever the teaching process actually is, lecturers play a key role in that process. In order to make the role be played effectively, lecturers always need to improve themselves in lecture delivery skills. Thus, after each teaching cycle, we can improve ourselves from the feedback of students, peers, or examiners and the self-studying process. Some feedbacks are useful, but others may be not. For common feedback, we should pay more attention and take proper action. In addition, the technologies are developing very fast, we have to spend a lot of time to learn both the existing knowledge and the advanced knowledge. Once after we have grasped the subject to be presented and incorporated the existing comments, we can deliver our lectures more effectively and efficiently.

4.1 Teaching activities

For a lecturer, it is natural for her/im to deliver lectures, supervise labs, run workshops, or attend seminars. While s/he teach others, it is important for her/im to improve her/imself. A lecturer not only needs to improve her/is subject knowledge, but also the skills how to deliver the subject knowledge. So the teaching activities include two aspects: those for improving subject knowledge and those for improving presentation skills. The former can be achieved through self-study and research, while the latter can
be achieved through practice and feedback from peers, students, or attending educational conferences, seminars, or workshops.

4.2 Design/planning

4.2.1 Teaching planning

It is always useful for both students and teacher to set up goals to be achieved even before lectures start. Teachers help students (1) set up a large number of sub-goals; (2) how to identify problems in order to reach the final goal. An effective expression of the important goal setting guidelines is that you should set SMART goals (http://www.time-management-guide.com/goal-setting-guidelines.html). What the SMART goal setting guidelines actually mean is that your goals should be Specific, Measurable, Attainable, Rewarding, and Timely.

With a specific goal you can clearly see what it is you want to achieve, and you have specific standards for that achievement. In making your goals specific it is important that you actually write them, which is crucial in all goal setting guidelines.

The more specific is your goal, the more realistic is your success, and the shorter is path to it.

When you work on making your goal specific, you program your subconscious mind to work for you. Then, your feelings and thoughts will lead you to your goal instead of pointing at the obstacles. To make your goals specific you also need to work out the other components of SMART goal setting guidelines below.

For a goal to be measurable you need a way to measure the progress and some specific criteria that will tell you when you can stop and the goal is achieved. Feeling the progress is very important for you to stay motivated and enjoy the process of achieving the goal.

An attainable goal is a goal for which you see a realistic path to achievement, and reasonable odds that you get there. This does not mean that the lower you aim the more likely you reach success. It is well known that goals that work best have a challenge in them. They are chosen as ambitious as possible, but still reachable. Then they will give you more motivation and sense of achievement.

A goal is rewarding when you have clear reasons why you want to reach that goal. This is one more place where it is important that the goal is really yours. Have your specific reasons and expected reward in writing. If possible, even with some visual pictures.

Imagine how you are going to feel when the goal is finally reached. This will ensure that the goal is really worth achieving. Then, every time you get stuck and don't feel motivated enough, read your reasons and look at the pictures. This is a known and very powerful practical technique of how to get through difficult moments and not quit.
The final requirement of the SMART goal setting guidelines is that your goal should have a specific time limit. This is also very important for your subconscious mind. Besides, time is the price you pay for the reward from achieving a goal. Setting the deadline will protect you from paying higher price than the goal is worth. This is also your protection from procrastination and perfectionism.

4.2.2 Activities

Before actually delivering lectures, the lecturers must have a clear idea what strategy they will use in classrooms. Even though this process can be done unconsciously, it does occur at an initial stage of teaching. Teaching strategies are how you deliver your lectures, interact with students, and get feedback from students. Thus the following methods can be used to deliver lectures (Eastcott, 1992): uninterrupted telling? overviews? repetition? questioning? testing? setting problems? debate? or checking on learning?

Due to the various natures of different subjects, different modules can be delivered using different methods. Even for the same modules, different lecturers may adopt different methods for lecture delivery. They all can achieve the teaching and learning goals. But whatever methods are used for lecture delivery, it is important to integrate lecturer, students, and subject together. Centrally, we would like to create a pleasant environment for students to sit in. In this environment, students not only learn surface knowledge, but the deep knowledge as well.

If in a whole lecture, the lecturer speaks without any stop, then clearly the students have to passively follow what the lecturer says. In this case, it is easy for the students to be distracted or feel bored. Then both the teaching and learning efficiency will reduce. If in a whole lecture, the lecturer does not say much and the students play a main part and talk with each other, then the lecturer can hardly deliver the contents required in the syllabus, even though in this case, the students feel relaxed. If in a whole lecture, both the lecturer and students chat without regard to the subject, then the students cannot learn anything about the subject. Thus, it is important to organise the lectures in such a way that every component in the teaching and learning system plays a full part so that the lecturers can deliver lectures in an attractive and effective way, the students can learn efficiently and at leisure, and the teaching and learning climate is friendly.

4.2.2.1 Small group teaching

Small group teaching is a common practice in higher education. Small group discussion fulfills several important goals of higher education (Jaques, 1990). It encourages students to organise their thinking by comparing ideas and interpretations with each other and to give expression, and hence form, to their understanding of a subject. It is therefore immensely important as a vehicle for learning. Small group discussion has extrinsic values too. There is an increasing need for professionals to demonstrate oral skills in committees and in more general communication with clients and colleagues. Cooperation and team work have become essential features of most work situations, as have skills in listening, drawing out information, and persuading.
There are greater expectations of the graduates’ ability to communicate and this is further underlined by the high standards set by radio and television that make for more critical audiences.

However, the organization of small group discussion has to be well planned. First, a good topic has to be first selected. The lecturer must make sure that nearly everyone has something to say on the topic. Thus, the topic must be general and relative to students’ life experience or imaginative. Second, the lecturer must make sure that everyone has participated in discussion and should avoid the case that talkative students dominate the discussion and reticent students make little contribution to the discussion. For this, the lecturer can let students speak in turn or someone dominates the speaking, all others make additional remarks in turn. Third, the lecturer must make sure that the discussion climate is active. If not, the lecturer must provide additional topic or ask questions to stimulate the discussion. But when doing so, the lecturer should avoid the case that s/he is the focus of the discussion.

4.2.2.2 Demonstration

Demonstration is a useful way for lecture delivery, providing a stimulating break for listening and writing (Rust, 1990). Demonstrations include cases of: modelling a particular skill, procedure, or performance; displaying something as sample, instance or example in order to help comprehension of a concept; using a model or other device to emphasise vividly an idea which is important to be remembered; presenting an actual or simulated situation that poses an important question for students to ponder; and using some non-verbal means of communicating information or ideas for which words alone are inadequate. In brief, a demonstration could be anything we choose to do during a lecture that can be described as showing them as distinct from telling them. However, a demonstration must be well planned and justified and it should be closely related to the subject we are presenting.

4.2.2.3 Brainstorm

Whatever the topic is about which we are lecturing, a class can generally be expected to have some ideas of its own about it. Sometimes, perhaps often, those ideas will be relevant, useful, and constructive (Rust, 1990). This is especially true for artificial intelligence modules and computer graphics modules where we would like to simulate the human brain in solving real world problems and human eyes in looking at and interpreting the real world. Obviously, students have rich life experiences and probably have thought deeply. Thus, at the beginning of lectures, it will be useful to let students to express themselves and then summarise afterwards. When different opinions are collected and elicited, we should not criticise anyone whose opinion may be absurd. In doing so, the learning is not only effective, but relaxed as well.

4.2.2.4 Varying the input source

In the lectures, the longer the unbroken timetable period, the more essential to vary topic, style of delivery, pace of presentation, personnel involved, or demands on students (Rust, 1990). Doing so always makes sure that students is on alert and their attention can be drawn. Students not only can follow what the lecturer says, but also
try to make sense of what the lecturer says. Consequently, students can learn effectively and spend the time with ease.

4.2.2.5 Project supervision

Project supervision is a normal routine in teaching. First, good projects have to be set. A good project should: have a useful end-product, involve discovery by student(s), be in some measure unpredictable in process and outcome, involve integration and presentation of skills and knowledge, offer flexibility both in terms of direction and pacing of work, comprise a problem which is worth solving, instruct the student in her/his own abilities, and display the student’s abilities on a board spectrum. It could also involve interaction with others and learning to present other complex sets of research findings (Jaques, 1992). Once projects have been set, they should then be presented to students. If students are interested, then they will select them. Once students express their interests in doing the projects, we need to communicate with the students about the specifications of the projects: constraints, user demands, functional requirements, human-computer interface, system integration and test, system maintenance, user feedback and system update. However, due to limited time to be spent on doing projects, it is generally impossible for a student to consider all these aspects. Thus, we have to emphasize only some aspects of projects.

Once what projects require is clear, we can recommend some classical papers and books for students to read. From then on, students begin to do literature survey and try to identify what techniques are used to solve the problems. In general, students are encouraged to implement some classical algorithms for solving the problems. The implementation of algorithms provides a good chance for students to have a clear picture how the problems can be solved, what should be paid more attention, what advantages and disadvantages the algorithms have. What is more important is that the implementation provides an opportunity for students to identify new problems to be tackled and stimulates their learning and problem solving interests. When students implement the algorithms, they may encounter a lot of new problems. As lecturers, they should help students and discuss all possible solutions and encourage them tackle difficulties in solving both the old and new problems.

Once students have a good understanding of the projects, then they have to sit down and develop their solutions to the problems. The projects can be tackled from two aspects: improve the existing techniques or develop new techniques. It depends on students’ interests and the progress they have made so far.

The final stage of doing projects is to write theses. Once they have done all the work on projects, then it will be relatively easy for them to put different pieces of work in a logical order, meanwhile they have to reflect their experience in how to approach problems, how to plan their time and effort in solving problems, what new problems were encountered and how they were tackled, how to develop a complete solution to the problems, how to integrate and test the systems, how to write the user manuals, and the like. Of course, the presentation should be easy to read and understand. And also, we should encourage students to put all pictures, tables and drawings in a right place, typically in the main text, rather than as appendices.

4.3 Implementation
4.3.1 Scenario introduction

Even though the students are clear that once they have entered a university, then they will learn academic content. However, they do not necessarily make sufficient mental preparation for the acceptance of abstract academic content. One possible scenario is that once a student has entered a university, s/he feels very excited. But once they have begun to receive the abstract content, they may find that they can hardly understand the abstract content taught by the professors at the university. In order to ameliorate learning environment, it is useful to connect academic content with students’ life experiences that can spark students’ interest and maximize brain functioning. Thus, for a new topic, a good scenario introduction can make students feel that the subject is natural and easy to understand and interesting to follow, meanwhile the aims and objectives of the subject can be introduced and justified.

4.3.2 Presentation of principles

In general, the principles and algorithms are abstract. Thus, the presentation of principles is probably the most difficult part in teaching, since the principles are relatively difficult to understand and justify. However, this does not mean that we cannot do anything about it. First, we can explain the principles mathematically in plain English. This means that we can reveal the relationship between different variables in the principles. Second, we can demonstrate the principles using examples. Given a simple scenario, we can formalise the knowledge we have and then put all the parameters in the right place in the principles and compute the parameters of interest. Finally, we can animate the process of calculation of the parameters of interest using computer programming and graphics tools. Consequently, we not only tell students what the principles are, but also show them that the principles are effective in solving problems.

4.3.3 Association of principles with life

The association of principles and algorithms with life is not an easy task, since the association must be realistic, but not farfetched. Thus, the association must be carefully selected and designed so that the principles and algorithms can be clearly expounded. Since the principles and algorithms have been embedded into a realistic scenario, the principles and algorithms can be easily understood and modified to other applications. This not only helps students learn surface knowledge, but also help them learn deep knowledge. Thus, the association of principles and algorithms with life experience plays a key part in delivering stimulating lectures.

4.3.4 A comparative study of principles

It is important to be able to compare different principles and algorithms from which common and discriminating characteristics among different principles and algorithms can be identified. The identification of such characteristics can deepen the understanding of the principles and algorithms and help them creatively apply them in the real world. Without a deep understanding, students can easily forget the principles and algorithms, let alone apply them to solve real world problems. The comparison of different principles and algorithms is sometimes difficult and not trivial, since
extent how to deliver lectures. For quantitative learning about “identify”, “do simple procedure”, “numerate”, “describe”, “list”, “combine”, and “do algorithms” (Biggs, 2003), we at least need to show and demonstrate what we are talking about. In order to teach students the qualitative knowledge about “compare/contrast”, “explain causes”, “analyse”, “relate”, “apply”, “theorize”, “generalize”, “hypothesize” and “reflect”, we have to get students involved. The quantitative knowledge is about “what is”, while the qualitative knowledge is about “how to”. In general, the quantitative knowledge is basic, however, the qualitative knowledge is more desirable. Thus, our teaching must be students centred, designing lectures so that students can get involved and understand not only what we are talking about, but also know how to apply the knowledge learnt to solve real world problems. For the latter, the students must be able compare the techniques available and select an appropriate one for the problem to be solved.

Learning can be classified into two categories: cooperative learning (supervised learning) and collaborative learning (unsupervised learning). Obviously, these is an essential distinction between these two categories: the former treats learning as a passive process in which learners have to passively accept what they are told, while the latter treats leaning as an active process in which learners can learn from both their teachers and themselves. In either process, learners play a vital role in assessing the both the teaching and learning efficiency.

Learning requires that students can commit fully to their goals. Thus they should always bear in mind what they are learning. As a result, they can work out the solution to the problems they have either through their self-study or through the help from their teachers. The consequence of such full commitment is that students are satisfied with the achievements that have made.

4.6.2 Interaction with students

It is very important to get feedback from students whenever possible. Regardless of the teaching strategy we choose, giving the student the chance to test his or her ideas, to take risks, and to be creative will promote learning. We who lecture have to constantly remind ourselves that our listeners want to say things and need to say things. The lecture may be better for everyone concerned if the lecturer listens to students during it. Lecturing to a perpetually silent audience is like holding a conversational monologue. It is working in a data-free environment. That may be agreeable to some lecturers, at the price that we remain culpably ignorant of many things concerning our students—and pertinent to their learning—that they could and would tell us, if only they had chance. Feedback can be got at different stages, of course-before, during, and at the end of lecturing, as well as subsequent to the lecture (Rust, 1990).

Some feedback may take some time to obtain. But some approaches can be used to get feedback within five minutes (Habeshaw, 2004). For example, if you want to check teaching, you can ask students to (1) please write 1 or 2 specific things I do which help you to learn on this course/module? (2) please write 1 or 2 specific things I do which hinder your learning on this course/module? (3) use the boxes below to offer specific practical suggestions on ways in which I could help you improve your learning: STOP..., DO LESS OF..., START..., DO MORE OF.... If you want to check learning, you can let students write (1) what is the most important or helpful thing
you’ve learned so far in this session? (2) what question(s) are in the forefront of your mind at the end of this session? (3) what would you like to be clearer about right now?

Clearly, what students say is not necessarily the same or even similar to what we will say. Thus, for students, they can find the difference that has the role of justifying the fact that they need to learn from their lecturers. For lecturers, they do not need to repeat what students have already known. Thus, letting students say in lectures promote both knowledge transmitting and learning facilitating.

Answering and asking questions is normal routine in classroom. However, how to practise answering and asking question session is really an art and it depends on you, your students, your course objects, and other unique considerations (Cashin, 1995). For the questions asked by students, you can rephrase the questions so that other students can hear the questions, let students have time to think about the questions, and make sure that the questions were understood correctly. When answering questions, you can directly answer questions. But you can also expand the analysis of the questions and provide an opportunity for students to work out answers themselves. When you ask questions, you can ask either close-ended or open-ended questions. But, in general, open-ended questions may solicit more responses from students, since they take a less risk in answering such questions.

Before asking “Any questions?”, we can ask students to write what they understand and/or do not understand the topic we presented, what they like to know more about, and so on. Given them several minutes, then we can invite them to share some of the things they have written, which leads more easily to oral comment and useful discussion (Rust, 1990). When we provide feedback to students, we should accentuate the positive; be careful always to praise gook. No one learns anything faster when he feels he is successful. In addition, the feedback should be given as soon as possible. Otherwise, students may lose interests to look at and respond positively to the feedback.

Lecturing without considering our audiences is blind and its efficiency for both transmitting knowledge and facilitating learning is low. Since the coverage of certain subject is not our goal, we have to focus on whether students have understood the contents we have covered. If not, we should take some actions to compensate for it, such as letting students do some exercises or running revision lectures. The disadvantage of doing so is that we can hardly deliver lectures as planned. However, we have to look after students to the utmost extent. Feedback also provides useful information for planning lectures, changing lecturing focus and pace. Discussion in group is a good way to activate the classroom atmosphere. However, sometimes, students are passive and reluctant to participate. If this happens, we should encourage them, or even talk with them individually. In order to get students involved, we can let students to express their opinions individually. If so, then students have to think about the problems and work out possible solutions. Doing exercises is another way to get students involved and is an excellent way to reveal problems, since sometimes students do not know what problems they may have. Doing exercises provides a good chance for them to apply the knowledge they have learnt.

Learning is made easier when students are aware of their progress. Positive feedback can motivate them to greater effort because it makes their goals seem attainable. Also,
ask your students how they feel they are doing. They probably want to take part in assessing their own progress toward learning goals, and their input can guide your feedback. You will find their reactions are usually based on what “feels right”.

The above discussion clearly shows that it is of vital importance to get students involved in the process of transmitting knowledge and facilitating learning in teaching. Thus, we should always try to interact with students in different ways.

### 4.6.3 Learning assessment

Whatever motivations students may have, learning assessment is often one of the most concerned problems for them. To a large extent, the learning assessment also determines how students approach the module. Thus, it is useful at the beginning of the lectures, the learning assessment is clarified so that students can be relieved from worrying about the final examinations. This means that from the first lecture, we are trying to create a light-hearted environment for students’ learning and change their motivation from passing the module to learning knowledge covered in the module.

### 4.6.4 Facilitating learning

In this teaching style, the students must behave actively. First, they must set up desired learning outcomes. Then lecturers align their teaching activities to facilitate students’ learning so that their desired learning outcome is attained. In order to make sure that the teaching can facilitate students’ learning, students must always provide feedback about whether the teaching activities are helpful for their learning. Once the feedback from students is provided, the lecturers must consider whether they need to adjust the teaching content, pace or even teaching styles. For example, after a subject has been discussed, the lecturer finds that most students do not understand the contents covered, let alone apply the principles and algorithms to solve problems. At this time, the lecturer may choose to stop delivering new subject, but instead, let students do some exercises or discuss some important principles from which the lecturer can find problems, and provide further explanation if necessary, handwrite the procedure of problem solving on the whiteboard step by step so that students can follow. Doing so of course needs time. This means that the lecturers sometimes have to make a tradeoff between the new contents to be covered and the students’ deep understanding of the existing contents.

But in practice, students are not always active in providing feedback. And sometimes students are not clear about their desired learning outcome. So while we can stimulate students to get involved actively, we may combine both the processes of facilitating learning and transmitting knowledge.

### 4.6.5 Professional development

It is a good practice to attend a number of professional development programmes so that some necessary skills can be learnt or strengthened. Since our university runs the programmes, it is convenient to register and attend the programmes. For example, report writing: fit for purpose and reader friendly is a good course from which report writing skills can be freshened and updated. For latest subject knowledge, we have to read books, websites, reports, and research papers and do research so that old
knowledge can be verified and new knowledge can be developed. The new knowledge is especially important to enrich the contents to be covered in lectures. Thus, it is always encouraged to do research on the subject to be taught.

4.6.6 Self-evaluation

Self-evaluation is critical for improving our teaching qualities. Clearly, before we collect the feedback about our teaching, we are determined to improve our teaching qualities, but not to revenge anyone else and get flattered. Thus, whatever feedback we have received, we should be even-tempered and good-humoured in treating and analysing it. In order to evaluate our teaching, we have to find some reference for the evaluation. In general, we can evaluate ourselves using five sources of information (Fink, 1999): self-monitoring, audio and video recordings, information from students: questionnaires and interview, students’ test results, and outside observer. The information from different sources has its own advantages and disadvantages and thus, we should use them synthetically and make our own choice. As a result, we can evaluate our teaching objectively and make proper changes in teaching where necessary.

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