

*Active learning involves strategies/instructional activities that engage students in higher-order thinking tasks such as analysis, synthesis and evaluation. This issue of CDTL Brief on **Active Learning** discusses some strategies and offers some tips on how to incorporate active learning in the classroom.*

## Teaching Engineering Fundamentals by Using a Hands-on/Historical Approach

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### **Traditional teaching of engineering fundamentals**

In the teaching of engineering-related disciplines, the importance of understanding basic scientific principles cannot be overemphasised. Quite simply, the success of the whole enterprise depends on how well the fundamental principles are taught. A good teacher (in the context of engineering education) is one who teaches the fundamental concepts well—an art that requires considerable skill. It is not just a question of teaching methodology, but also one of wisdom and experience. The primary role of personal experience in the acquisition of knowledge has of course long been recognised<sup>1</sup>. A good lecturer is often someone who can draw on personal experience and teach in simple terms that students can relate to.

At present, most Engineering foundation courses in universities are organised and taught in a fairly impersonal way. Not only are the classes large, the course content is also usually presented in the form of technical diagrams and formulas without any reference to their historical context (e.g. When was a particular principle first discovered? Who discovered it? How did it come about? What were the problems that inspired it?). There is usually little in the lecture

material that correlates directly with the students' experience and practical applications of the principles are seldom mentioned. Even in tutorial classes, which are specifically designed for personal involvement, there is hardly any room for the students to be creative. Questions usually come with preset answers and student participation is limited to how they arrive at the predetermined answers.

Most Science and Engineering foundation courses at present require students to complete a certain number of laboratory exercises. Although these laboratory tasks are designed to provide students with some hands-on experience of the theoretical principles covered in lectures and tutorials, in reality the laboratory exercises give students very little opportunity to carry out genuine scientific investigation. This is because the laboratory experiments invariably consist of predefined tasks on set pieces of equipment. The apparatus often restricts students to merely pushing buttons and recording data, leaving little scope for students to innovate or experiment for themselves. Most Science and Engineering students at the foundation level therefore do not have the opportunity to practise science, and

their knowledge of fundamental principles is largely theoretical. To be fair, NUS Engineering students do have more personal interaction with their lecturers in later years through project work. Though some engineering departments allow for project work in the foundation years, it is often limited by curriculum constraints.

### **The hands-on/historical approach**

In the last few years, I have tried teaching engineering fundamentals using an alternative approach. A basic course on electricity and magnetism was designed to involve and engage the students personally. This course employs a hands-on/historical approach to teaching as opposed to one that relies only on formulas and technical diagrams. The basic scientific principles are introduced through historical stories. Lectures consist of case studies that attempt to put students in the frame of mind of the original inventor or discoverer. I give students a historical problem or episode and invite them to investigate it by asking, “what would you do?” I also continually compare students’ answers to what actually happened historically. Gradually, an interesting story which the students have actively participated in unfolds. At the end of the lecture, I perform several experiments using ordinary and readily available materials to re-create different aspects of the historical episode discussed. The students’ assignments require them to re-create the episode for themselves using their own materials. Specialised materials are given if required. Students typically have one to two weeks to do their own home experiments. They are told that their aim is to illustrate the underlying scientific principles involved creatively. They are free to re-create historical experiments or devise their own original experiments. During the tutorial, students would take turns to present their experiments which are graded by the other students and me.

The following is an example of how the hands-on approach can be used in the teaching of simple electrostatics. The usual traditional starting point in teaching electrostatics is to present a formula for Coulomb’s Law<sup>2</sup>, accompanied by a diagram of two charged spheres separated by a certain distance. There is usually some brief (one or two paragraphs) historical introduction. Students are then introduced to the concept of an electric field in mathematical terms, as the force per unit charge. The electric field

is discussed as a Vector Quantity, and is calculated for simple charge distributions and conductor shapes. Thus, most students learn about electrostatics the theoretical way. Many have never experienced holding two charged spheres close together and even fewer have tried to measure electrostatic force or generate it for themselves.

An alternative introduction to electrostatics is to study a leaf electroscope<sup>3</sup>—one of the first instruments devised to measure electrostatic charge. During my lecture, students get to see how to create the instrument using simple materials. I would take a glass bottle with a plastic cap, secure a brass door-knob on top of the cap by making a small hole, and suspend two aluminium foil strips from a metal hook hung from the brass door-knob. Students also get to see it in action when I rub a PVC rod up and down with a woollen cloth and bring the rod close to the home-made electroscope, causing the aluminium strips to separate. It is a spectacular sight. Students can then go on to learn about Coulomb’s original torsion balance experiment and re-create it for themselves. Through carrying out such simple experiments by themselves, students can relate to the laws of electrostatics based on what they have experienced. When students are given opportunities to devise their own experiments using their own materials, it becomes a personal learning process. In this way, Coulomb becomes more than just the name of a ‘law’. Students can appreciate the 18th century French physicist’s contributions to electrostatics in a more meaningful way. All of these learning activities also enhance the students’ understanding of the basic scientific principles involved.

There are, of course, many more examples. The invention of the battery is a fascinating example that started historically with the twitching of a frog’s leg. The students discover that there are many home-made ways to create the ‘battery effect’ thus leading to a better understanding of the basic principles underlying electrochemistry. In all branches of Engineering, it is possible to recreate classic historical experiments using simple and readily available materials. It must be noted however, that the situation may be more complicated in other engineering subjects. In Chemical Engineering for instance, dangerous chemicals may be involved and these experiments may need to be done in a laboratory.

So far, I have used this hands-on/historical approach for classes of up to 30 students. In principle, it is possible to use this method for large classes although the degree of student participation will naturally decrease. However, demonstrations can still be presented to students after the lecture, so that students can tinker with the demonstrations for themselves. Moreover, home-made experiments can still be carried out as practical assignments and presented during tutorials. With the help of CDTL, I have created a website (see <http://courses.nus.edu.sg/course/eleka/electmagnet/>) which contains some

examples of demonstrations in electrostatics to promote the use of hands-on/historical approach in teaching engineering fundamentals.

#### Endnotes

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# Active Learning: Scenario Thinking in an Uncertain World

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In today's uncertain world, change is the only constant. We can manage change by playing a waiting game and then be surprised or overtaken by circumstances when events unfold; or we can anticipate and prepare for events, even to the extent of influencing or making the events work in our favour. By anticipating change, we can make the best possible decisions or find novel solutions to new and existing problems that we face everyday.

In the Civil Service and the formulation of public policy, *scenario planning and thinking* has been widely implemented as an important mechanism to help decision-makers anticipate change and understand how the changes will affect both organisations and individuals. People tend to develop certain mental maps of how things work and view issues or events from a certain perspective based on their own assumptions. Essentially, scenario planning and thinking involves questioning those assumptions so as to think about the future and the plausible outcomes based on what we know of the world today.

In the academic context, scenario planning and thinking is a very useful tool to incorporate as part

of the pedagogy to enhance students' critical thinking processes. Scenario planning and thinking allows students to experience real-life decision-making in the safety of the classroom by exploring creative and alternative solutions to a range of possible future outcomes and exercising critical thinking in the process. The essence of scenario planning and thinking is for students to ask 'what if' questions, develop likely scenarios and then find the best possible solutions to deal with those scenarios.

#### **How does scenario planning and thinking assist students' learning?**

Scenario planning and thinking is very effective as a teaching tool, especially for constantly changing and dynamic modules that are industry-linked and practice-oriented. Students would be able to relate the unexpected situations and unusual scenarios that arise in the industry to particular trends or specific events. In other words, students would be able to identify the key driving forces and constraints that operate in the industry or environment.

Unlike case studies and problem-based learning which focus on a particular situation at a single point

in time, scenario planning and thinking provides an added dimension in that a range of possible real-life illustrations is developed over a period of time into the future. Students would be able to examine the impact and implications of several scenarios, their interrelationships as well as how those scenarios evolve over time.

As scenario planning and thinking raises one's awareness of how the future could be, how opportunities could be maximised while minimising negative effects, and serves as an efficient channel to highlight or incorporate the latest ideas, developments and innovations in the field. Students would not only be kept updated with the latest developments, challenges and issues, they would also be encouraged to formulate new breakthroughs and strategies when they explore the range of plausible scenarios and learn how to manage them.

Scenario planning and thinking does not predict the future. Instead, it provides a suitable platform for formulating policies and contingency plans that are sufficiently flexible and pragmatic so that they could adjust to future events as they unfold. Thus, in addition to appreciating the significance or relevance of existing policies, statutory regulations and legislation, students could also test their own policy proposals and strategic ideas for validity and robustness against various scenarios that are mapped out.

As the value of scenario planning and thinking lies in its ability to translate scenarios into operational strategies and solutions, it is a valuable mode of learning which helps students acquire critical thinking and creative problem-solving skills. Students would be able to reflect on theoretical concepts learnt in classroom and apply them to solve real-life illustrations or scenarios, or they may even explore totally novel methods to resolve the issues.

The contribution of scenario planning and thinking lies not so much in the scenarios themselves but rather in the process by which the scenarios are developed. This is because scenarios get outdated the moment they are formulated. However, the development of

scenarios often entails group discussion and decision-making among people from diverse backgrounds and interests. Students would therefore be able to experience group dynamics, conflicts as well as convergence and divergence of views in the course of generating the wide range of scenarios.

I have used scenario planning and thinking in my third year RE3485 "Property Management" tutorial classes as well as project-based continuous assessments. The students taking RE3485 are matured working adults attending a part time Bachelor degree course. With their working experience and knowledge of the industry as well as the information gleaned from lectures and references, these students are guided through a process of experiential learning, where role plays, field research and hands-on experiences are employed. The students' perspective as well as critical and creative thinking skills are broadened with the application of 'what if' questions when they go through the process of developing scenarios. Furthermore, by exploring ideas and issues beyond the existing situation, the students also manage to learn things outside the context of the classroom as well as through their own discovery and research.

In addition to the above learning points, more importantly, scenario planning and thinking tends to nurture active learners by motivating students to think about alternatives when developing scenarios, prompting them to explore innovative ideas when deriving strategic policies and solutions to deal with each scenario, as well as making them more aware of the constantly changing circumstances, hence producing a more adaptable cohort of students who can anticipate and manage change. ■

# Taking Charge of Learning

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It is not uncommon to see the following scenarios where the teacher espouses the active learning approach:

## *In the classroom*

- Students actively responding to the teacher's lectures, questions as well as challenging some of the ideas presented.
- Students discussing the topic assigned by the teacher in small groups.
- Students writing a reflection paper on what they have learned at the end of the lesson.
- Students engaging in debates, passionately defending their positions.
- Students performing a number of different tasks in groups: one group draws a concept map of the lesson, another group presents a case analysis while the rest of the class critique.
- Students engaging in problem-solving scenarios where applicable (e.g. in a culinary arts class where cooking and food preparation is best taught through demonstrations and hands-on approaches as opposed to pure lectures).
- Students conferring with each other, finalising their notes, reflecting about the lesson and raising whatever questions or issues they want clarified during the breaks in lectures.

## *Outside the classroom:*

- Students busy preparing for their lessons (advance reading, conducting library and/or field research for a course project).
- Students preparing their portfolios (a collection of students' materials showcasing an accumulation of their learning).

- Students participating in college-wide activities (community service and on-the-job training or practicum).
- Students actively seeking representation in a participative decision-making process in the institution.

## **What is active learning?**

Active learning is an educational approach that allows students to participate actively, both in the determination of the course content and in the process of learning. Guided by the course syllabus, students collaborate with the teacher in determining specific topics to be undertaken in order to achieve the learning objectives. Process-wise, students give suggestions on possible teaching methodologies. They also help determine how the achievement of certain course objectives will be measured (e.g. the basis of their grades at the end of the term).

From the learning activities described above, students are actively learning by participating in the activities of the coursework, college or university, as well as the greater community. This is a shift from the traditional view that learning is totally in the hands of the teacher. Teachers now realise that students are not merely receptacles that will sit passively, imbibing whatever the teacher lectures. It is now recognised that students learn better when they realise and understand the importance and significance of what they are learning. Students are better motivated if their learning is applicable in the 'here and now' and relevant to their future roles in the society. Further, students learn better when they are consulted on matters that affect them directly, such as how their learning is assessed, what project papers are required, the teacher's expectations on class participation and the like. The literature on

active learning further shows that students' active participation in their learning improves their retention of course materials. As students participate in class discussions, reflect on what they are learning, and help determine course coverage as well as the manner of their assessment, the teacher is in effect encouraging and requiring students to engage in higher order thinking, such as synthesis, analysis and evaluation.

### **What is expected of students?**

The active learning approach therefore presupposes that students are willing and able partners in their education. It means that students are expected to be responsible students who take charge of their learning, manage their own learning, and be willing to invest their time and efforts in the attainment of learning goals. Being responsible learners means that students will take an effort to find out the required information, guided by their learning styles.

Effective learning requires learners' active participation in the learning process. Education is not a one-way process where teachers deliver and students receive. Responsible students uplift the academic standards of the college.

### **What is expected of teachers?**

There is a maxim that a good teacher makes himself/herself increasingly unnecessary. As the teacher becomes a facilitator of learning, he/she increasingly takes the back seat as students become progressively more responsible for their learning. However, this does not mean that the teacher become less of a leader or authority. On the contrary, for active learning to be effective, any teacher would intuitively have the inkling that much more is expected of him/her. Hence, resistance among the faculty may be expected.

There are a number of reasons why teachers may resist the active learning approach:

- Students may not participate. Teacher might need to spend precious time motivating students to participate.
- Teaching methodologies associated with active learning necessarily entail extra preparations.
- Lack of facilities and other support mechanisms.
- Lack of training on how to impart knowledge other than through pure lecture.

It is advised that active learning be introduced gradually to minimise perceived risk-taking and reduce anxiety for both teacher and students. Concerted effort among all teachers at all levels is necessary. As the classroom is a microcosm of college life, active learning must be supported college-wide. Learning should be an accumulation of experiences across all course curricula towards the acquisition of a college degree; active learning should be a concerted effort not only among teachers but of the administrators as well.

### **What is expected of administrators?**

Continuous quality improvement—a quality philosophy that considers students as clients, and where the college solicits internal and external feedback as inputs to be considered for continuous improvement efforts—stresses active learning as an imperative for the improvement and maintenance of academic quality.

College is a preparation for citizenship. College education provides students with learning experiences that will prepare them to be productive and socially responsible members of society. By providing opportunities for personal and professional growth, college life equips students with knowledge, attitudes and skills necessary to face the real world. Inasmuch as we do not welcome passive citizens who do not seem to care less for either community or country, we likewise do not appreciate students who are passive learners who cannot be bothered about the academe. Since we propound participative decision-making at work, we should likewise advocate active student participation in the college programmes.

Administrators therefore play a vital role in the promotion, continuance and reinforcement of active learning. College newsletters can widely disseminate information related to efforts towards active learning and its relevance to academic standards. Faculty training should equip teachers with different teaching methodologies that foster active learning. Campus facilities should adequately provide, support and boost efforts towards the same.

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# Sample Interactive Lesson to Promote Comprehension Skills

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As far as the English language is concerned, I have taught students at all proficiency levels—beginning to advanced. I have always found happiness and satisfaction whenever my students participate actively in class. So, what do I do in the classroom to encourage my students to interact with one another? It is very simple. I give them the chance to formulate the questions themselves and ask one another those questions.

As Brown (2001) puts it, interaction is a collaborative exchange of thoughts, feelings, or ideas between two or more people, resulting in a reciprocal effect on each other. He further emphasises that the interaction

in various contexts is to negotiate meaning, to get an idea out of one person's head and into another person's head and vice versa. The following are steps I observe to create an effective interactive classroom lesson by providing a venue for promoting comprehension skills among students.

**Warm-up.** I usually ask students a few questions related to the text to activate prior knowledge. This is also to motivate students and prepare them for the lesson. Clarke and Silberstein (1977) stress the importance of activating schema or prior knowledge in learning. According to them, readers understand what they read because they are able to take the

stimulus beyond its graphic representation and assign its membership to an appropriate group of concepts already stored in their memories. For example, in a social studies reading text, *Who Discovered America?* (Roger & Olsen, 1992), the following questions can be asked to activate prior knowledge:

- Who has been to America?
- What words come to your mind when you hear America?
- Can you name some of the famous American discoveries?
- Do you know who discovered America?

Some teachers may find this type of questions too elementary, but it is not always the case even for advanced students. Carrel and Eisterhold (1983) emphasise the role of prior knowledge in enhancing the reading and comprehension process. They explain that any given text does not carry meaning in and of itself. Rather, it provides direction for listeners or readers so that they can construct meaning from their own cognitive structure or background knowledge. One example cited by Hudson (1982) is the 'restaurant schema'. Comprehending someone's story about going to a restaurant depends, in part, on the schema that is instantiated as one listens. The listener would need to construct a correspondence between the schema he or she had activated and the actual information in the message itself. When both sources of information match sufficiently, the message is said to be understood. Thus, comprehension is not a matter of simply processing the words of the message, but involves fitting the meaning of the message to the schema that one already has in mind (Hudson, 1982; Rumelhart, 1980).

**First reading of the text.** I distribute the text to the class during lesson and ask each student to read a sentence. If the text has 20 sentences and there are 30 students, this will give 20 students a chance to speak by reading aloud. I have observed in my class that students enjoy the chance to speak through simply reading a sentence, which is a good start for interaction. Brown (2001) points out that this kind of reading serves to add some extra student participation. It also directs students' attention to the lesson.

**Questioning by the teacher.** I ask questions to elicit main points and details of the text. If it is a

heterogeneous class (mixture of students at different proficiency levels), it is suggested to write on the board, common questions such as WHAT, WHEN, WHERE, WHO, WHY, and HOW for the benefit of students who are less proficient. However, I make sure that I do not write the entire question, as students will copy it when I ask them to formulate their own questions later. This will defeat the purpose of encouraging students to think for themselves and promoting interaction by formulating and asking their own questions. By writing down their questions, the students' attention is drawn to a specific item we want to stress, and this will help them to learn (Sharwood, 1980).

I try to vary the kind of common questions I will ask to cater to students at different proficiency levels, for example:

"Yesterday I saw the new patient hurrying along the corridor. He seemed very upset, so I did not follow him but just called to him gently. Perhaps later he will feel better, and I will be able to talk to him later."

Some sample questions asked in response to the passage could be:

1. What did the writer see yesterday?
2. Was the writer in a hurry?
3. Was the patient upset?
4. What did the writer do because the patient was upset?
5. What is the problem described here?
6. Is this event taking place indoors or outside?
7. Did the writer try to get near the patient?
8. What do you think the writer said when she called to him?
9. What might the job of the writer be?
10. Why do you think she wants to talk to the patient?

The answers to questions 1–4 can be easily found in the text while those to questions 5–10 require students to infer. Questions 1–4 can be directed at less proficient students while questions 5–10 at advanced students. Constant practice through modelling by the teacher and students will gradually help slower

students formulate inferential questions (crucial for promoting higher-order thinking skills) that can in turn aid comprehension.

**Questioning by the students.** I get students to formulate and ask one another questions. For example, student A asks student B, student B asks student C and so on. The teacher might want to emphasise that the questions cannot be repeated. This will force the students to formulate as many questions as they can.

**Group work.** Students can work in pairs to formulate questions and then ask each other those questions. After everybody has shared with his/her partner, I tell the class to form groups of three and repeat the processes of formulating and asking questions. It should also be stressed that they cannot repeat the questions asked by the member(s) of the group. Assign a group leader to take note and report to the class all the questions formulated by the group.

Group work provides opportunities to talk. For example, a class that is divided into five groups get five times as many opportunities to talk compared to a full-class organisation (Long & Porter, 1985; Ur, 2002). Brown (2001) enumerates other benefits of

group work, namely: offering an embracing affective climate, promoting learner responsibility, and serving as a step toward individualising instruction.

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# Active Learning: Engagement for Meaningful Learning

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"Active learning means that they [students] can no longer look on with glazed eyes while their minds wonder to other thoughts" (Meyers & Jones, 1997, p. 162).

## Introduction

Thinking about classes in higher education often conjures images of large lecture theatres with students listening attentively to the lecturer and taking notes furiously. It seems that students who practise the above are to a certain degree, engaged in active learning. If this is so, why are lecturers

are often encouraged to look beyond traditional pedagogy to introduce 'active learning' in their classes?

## What is 'active learning'?

According to the literature on education, active learning goes beyond listening and taking notes. Bonwell and Eison (1991) define active learning as instructional activities "involving students in doing things and thinking about the things they are doing". Simons (1997) says that active learning has two dimensions: independent learning and active

working. Independent learning refers to involving students in making decisions about the learning process (e.g. choosing a research topic, evaluating peers' contributions in a group project and setting learning goals for a task). Active working refers to "the extent to which the learner is challenged to use his or her mental abilities while learning" (Simons, 1997, p. 19).

Active learning is based on the assumptions "that learning by nature is an active endeavour and that different people learn in different ways" (Meyers & Jones, 1993, p. xi). It can be promoted through the introduction of classroom activities which require students to exercise higher-order thinking skills such as analysis, synthesis and evaluation through participation in learning activities such as reading, discussion, writing and problem solving (Hativa, 2000). The successful implementation of these learning activities will "foster curiosity and the capacity to manage one's own learning agenda" (Stern, 1997, p. 13) and align the learning outcome to the life-long learning imperative of the knowledge-based economy.

### **How can active learning be incorporated into the classroom?**

#### *The active learning continuum*

Bonwell and Sutherland (1996, p. 5) propose the following the concept of an "active learning continuum" to help lecturers incorporate active learning in the classroom:

#### ***Simple tasks* ————— *Complex tasks***

The continuum moves from simple tasks (short and relatively unstructured activities) on one end to complex tasks (activities of longer duration, carefully planned and structured) on the other end. Neither end of the continuum is preferred over the other. An example of simple tasks is the 'pause procedure' where a lecture is punctuated by pauses at appropriate times to allow students to compare and rework their notes for a few minutes. Complex tasks could include a case discussion during the class session or a group project for the duration of the course (Bonwell & Sutherland, 1996). Regardless of where one's teaching methods fall on the continuum, active learning is practised as long as students are actively engaged in a lesson. The choice of teaching methods

depends on the course objectives, the lecturer's teaching style and students' level of experience in active learning (Bonwell & Sutherland, 1996).

#### *Other teaching methods that facilitate active learning*

In addition to incorporating student participation, discussion and questioning into the traditional lecture, the lecturer can also consider teaching methods such as visual-based instruction, in-class writing, case studies, cooperative learning, debates, drama, role-playing and simulation, and peer-teaching (Bonwell & Eison, 1991).

Indeed, the range of learning activities and demands of active learning can be a source of pressure and confusion for both lecturers and students. In order to effectively implement active learning, structure is important.

#### **Structure in active learning**

In active learning, lecturers need to structure the learning activities to engage students in the learning process. The most important factor which determines the design of the course structure is the delineation of course objectives. Though most of the course objectives will probably relate to the course content, Miller, Groccia and Wilkes (1996) suggest that course objectives relating to personal development (e.g. appreciation of ethnicity and the eradication of stereotypes) and professional skills (e.g. problem solving and teamwork) be included in active learning courses as well. In addition, a lecturer should take into consideration different learning styles and needs of students, in order to engage the maximum number of students possible in the learning process when designing the course structure (Miller, Groccia & Wilkes, 1996).

Miller, Groccia and Wilkes (1996) recommended the following levels of structure to prepare students for active learning:

- **Structuring the intellectual environment.** Help students develop a mindset that the course will be taught differently. Instead of going through a list of procedures and requirements for the course, communicate the course objectives to the students, show your enthusiasm in the subject and be open to shared inquiry.

- Structuring the curriculum flow and tasks. Structure the early assignments with step-by-step instructions to help beginning students, especially those who do not have much exposure to project work/teamwork. The less structured tasks can be reserved for a later part of the course.
- Structuring the class meetings. Incorporate active learning activities such as group discussions, quizzes and group cooperative activities (e.g. critical thinking questions) into lecture time at appropriate intervals. These activities allow the students to learn from one another as they interact.
- Structuring the assessment process. Align the design of assessments to course objectives. As students are expected to share ideas or information in active learning, it is important that the grading scheme does not result in students preventing their classmates from obtaining valuable information. In active learning, a ‘criterion-referenced’ grading system that compares students against a standard of performance might be more appropriate. However, lecturers need to take note of:
  - i) prevailing grading policies of the school, and
  - ii) problems in grading group-based assignments as social loafing and interpersonal conflicts may exist.

### **IVLE discussion forum—A tool for active learning**

From the preceding sections, it is obvious that the active learning approach requires substantial efforts in planning and implementation. Here, I would like to share my experience of using the IVLE discussion forum to complement various learning activities in class and to engage the students in the learning process.

In my General Education Module (GEM) GEK 1030 on service work in Semester I (Academic Year 2003/2004), I used the IVLE discussion forum for students to share their observations and viewpoints on service-related issues from everyday experiences. My role was to keep the discussions going by suggesting appropriate topics for discussions (i.e. providing the structure for discussions). Although

many students were using the IVLE discussion forum for the first time, various interesting topics related to the course materials surfaced in the forum and served as invaluable resources for discussions. Some students even shared their knowledge from other courses and work experiences to explain their observations. Others posed questions that reflected higher-order thinking. Students who did not participate in the discussions were kept updated during class discussions and encouraged to participate in future discussions.

A field trip—lunch at a restaurant with fine service—was organised for approximately 45 students. The field trip’s objective was to allow students to have real-life experience of concepts and theories discussed in the classroom. A veteran with more than 10 years’ experience in the service industry was invited to speak at the lunch. After the trip, students were required to post their experience on the IVLE discussion forum and relate it to what they have learnt from the module. Most students were delighted with the learning session outside campus and postings on the IVLE discussion forum showed that students were generally able to critically evaluate their experience based on fundamental concepts discussed in class.

The use of IVLE discussion forum took the time required for an active learning activity (discussion) out of the classroom and served as a useful tool for students to continue their engagement in course-related discussions even after class. Although the participation rate was not 100%, it was observed that some quiet students took the opportunity to voice their opinions in the forum. This was indeed a small step forward in promoting active participation from students who, for various reasons, were quiet in class.

An informal poll conducted at the end of last semester in my general education module revealed that students liked the interactive format of learning:

- “...the discussions helped develop our thinking ability.”
- “...the individual project was more helpful than the tests where you don’t have much choice of topics.”

- “...we can understand many concepts without having to memorise them.”
- “The group discussions provided a lot of insights and creative ideas.”
- “Every lesson is slightly different. Lunch was the best—real life experience.”

Last but not least, my satisfaction with the active learning approach in teaching the module was succinctly reflected by the following student feedback:

“The course enabled me to look beyond my own point of view and made me realise that my scope of thinking was actually very narrow. Never gave much thought to service but nowadays, I pay more attention.”

## Conclusion

As Sutherland & Bonwell (1996) suggest, active learning should not be implemented for its own sake, but for its ability to engage students in the learning process. Using the active learning approach does not mean splashy, highly-charged sessions with lots of group work. Rather, each lecturer needs to consider his or her own course objectives, teaching style and reflect upon what suits his individual needs in building up a repertoire of active learning strategies (Sutherland & Bonwell, 1996).

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