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UNIVERSITI SAINS MALAYSIA

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See Ching Mey

The Quest for Teaching Excellence

Centre for Development of Academic Excellence (CDAE), USM

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Editors:
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Foreword
by Vice Chancellor

I WOULD LIKE TO CONGRATULATE the Centre for Development of Academic Excellence (CDAE), Universiti Sains Malaysia (USM) for the publication of their first book titled The Quest for Teaching Excellence. It is with great pleasure and pride that I write the foreword for this book.

Striving towards academic excellence has always been the ultimate goal of education-based services throughout the world. Providing quality education requires the establishment of a systematic, coordinated, and well-balanced teaching and learning environment that adapts to the continuous social, economic, and technological changes that we face in today's world. Through the Ministry of Higher Education (MOHE), the Malaysian government has made it a priority to create a higher education environment that encourages the growth of premier knowledge centers to ultimately turn the country into a center of excellence for higher education. In this regard, USM has taken the necessary course of action to meet the challenge by establishing the CDAE, or *Pusat Pembangunan Kecemerlangan Akademik*. In addition to improving teaching quality among educators, this centre is involved in the planning and execution of activities that parallel the National Higher Education Strategic Plan and the National e-Learning Policy initiated by the MOHE. The centre is equally devoted to upholding the USM APEX Transformation Plan by developing and conducting activities related to 'Nurturing and Learning'.

The book *The Quest of Teaching Excellence* is published by CDAE with the aim of providing constructive and practical information to educators about teaching and learning activities. It includes excerpts describing real teaching environments written by experienced lecturers from various fields. The details in this book will definitely provide useful insights and novel ideas about teaching methods and philosophies. I am sure that fellow readers will gain valuable knowledge that will prove to be useful in facing challenges posed by the vast educational environment.

I am confident that readers will benefit by keeping a copy of this book with them, and recommend this book to educators from all fields.

PROFESSOR DATO' OMAR OSMAN
Vice Chacellor
UNIVERSITI SAINS MALAYSIA

Sekapur Sirih
daripada Naib Canselor

Setinggi-tinggi tahniah saya ucapkan kepada Pusat Pembangunan Kecemerlangan Akademik, Universiti Sains Malaysia atas penerbitan sulung buku berjudul "The Quest for Teaching Excellence". Saya berbangga dan berbesar hati dapat mencoretkan sepatah dua kata untuk mukadimah buku ini.

Usaha ke arah kecemerlangan akademik sememangnya sentiasa menjadi matlamat paling utama bagi perkhidmatan berasaskan pendidikan di serata dunia. Penyediaan pendidikan yang berkualiti mampu mencetuskan persekitaran pengajaran dan pembelajaran (P&P) yang sistematik, berkoordinasi dan seimbang yang dapat mendukung perubahan berterusan dari segi sosial, ekonomi dan teknologi yang kita tempuhi sekarang ini. Kerajaan Malaysia menerusi Kementerian Pengajian Tinggi (KPT) telah meletakkan kepentingan yang paling atas pada kemajuan persekitaran pendidikan tinggi yang akan menggalakkan pertumbuhan pusat-pusat ilmu ulung, yang akhirnya mampu menjadikan negara ini pusat kecemerlangan bagi pengajian tinggi. Berteraskan ini, USM telah mengorak langkah yang perlu selaras dengan dasar kerajaan menerusi penubuhan Centre for Development of Academic Excellence (CDAE) atau Pusat Pembangunan Kecemerlangan Akademik. Di samping memperbaiki mutu pengajaran dalam kalangan tenaga pendidik, pusat ini terlibat dalam perancangan dan pelaksanaan aktiviti-aktiviti yang sejajar dengan Pelan Strategik Pendidikan Tinggi Nasional dan Dasar e-Pembelajaran Negara yang dipelopori oleh KPT. Pusat ini juga sama-sama bertanggungjawab memperkasakan Pelan Transformasi APEX USM menerusi pembangunan dan pelaksanaan aktiviti-aktiviti yang berkisar pada "Pemupukan dan Pembelajaran".

Buku "The Quest for Teaching Excellence" ini diterbitkan oleh CDAE dengan matlamat untuk menyediakan maklumat yang membina dan praktikal kepada para pendidik tentang aktiviti-aktiviti P&P. Terkandung di dalamnya petikan-petikan daripada persekitaran sebenar pengajaran yang diceritakan oleh pensyarah-pensyarah berpengalaman daripada pelbagai bidang. Keterperincian buku ini pastinya akan memberikan pemahaman yang mendalam untuk mencetuskan idea-idea baru serta bernas tentang kaedah dan falsafah pengajaran. Saya pasti para pembaca akan memperoleh ilmu yang tidak ternilai, yang akan terbukti berguna dalam mengharungi cabaran-cabaran dalam persekitaran pendidikan yang luas.

Saya penuh yakin pembaca akan beroleh manfaat daripada buku ini dan mengesyorkan buku ini kepada para pendidik daripada semua bidang.

PROFESOR DATO' OMAR OSMAN
Naib Canselor
UNIVERSITI SAINS MALAYSIA

Preface

> "When it comes to teaching, most of us are still learning. Teaching is a complex activity, and yet most of us have not received formal training in pedagogy. Furthermore, teaching is a highly contextualized activity because it is shaped by the students we have, advancements in our respective fields, changes in technology, and so on. Therefore, our teaching must constantly adapt to changing parameters"
>
> Ambrose et al., 2010, How Learning Works

As the quotation above suggests, we believe that most lecturers at higher learning institutions (except those with a background in education) would humbly admit that, in the first few years of teaching at the university, they did not know much about the various learning theories and pedagogical aspects of teaching-learning. Let us accept the fact that most of us are not trained formally to teach. When we joined the university as an academic staff member, we did not have the slightest idea how to teach adult students. Without sufficient knowledge of pedagogy and teaching techniques, we had no choice but to use our intuition, and we developed our own approach based on our limited understanding of what good and effective teaching means. However, not having formal training in teaching is not an excuse for not doing anything to improve our teaching skills. Teachers, especially lecturers in higher educational institutions, should not take it for granted that basic exposure in teaching is adequate to help students to learn effectively.

We believe that our role as educators goes beyond transmitting knowledge; in fact, our role is to nurture our students to become lifelong learners, to teach them to 'learn how to learn', and to teach them to appreciate and love knowledge. This is the essence that will enable our students to become successful lifelong learners. However, if students are to become better learners, it is essential for teachers to become better at what they do. As teachers, we should not sit in our comfort zone but instead continue to grow by challenging ourselves to acquire new skills and new knowledge.

The task of preparing teachers to teach using a proper pedagogical (andragogical) approach is complex and challenging. Knowledge of the subject matter (or content) alone is not sufficient to be an effective teacher. That said, as in any profession, developing mastery in teaching is not something that can be achieved overnight—it is a continuous iterative learning process.

This book is a sincere effort to bring together the collective experience and wisdom of a group of lecturers who have been recognised for their commitment, dedication, passion, and enthusiasm in teaching. It is divided into two parts: Part 1 provides the general background and philosophy of teaching and learning in chapters written by experts in their respective areas, and Part 2 describes the different teaching practices, approaches, and strategies of distinguished lecturers who have received teaching awards from the university and also at the national level. We have endeavored to capture the essence of teaching within the wider context of nurturing our students by providing them with both knowledge and various 21st century skills. We trust that this book will be a valuable resource for lecturers who aspire to become great teachers and who continuously seek to improve their effectiveness in delivering high-quality, meaningful, impactful, productive, and memorable learning experiences for all students.

We hope our readers will enjoy reading this book while reflecting on their own teaching practices. Finally, we would like to share the following quotation:

> "Teaching has always been one of the greatest and most satisfying experiences in my life. Through the wonders of teaching we can reveal the hidden beauty to our students. Knowledge does not narrow, knowledge only adds... and without knowledge many experiences in life remain very narrow and very shallow."
>
> Professor Walter Lewin, MIT

Professor Abd Karim Alias
Professor Zainal Ariffin Ahmad
Professor Dato' Dr. See Ching Mey

Acknowledgements

On behalf of the editors, I would like to thank all the authors for making this book possible. I would also like to thank the Deputy Vice Chancellor (Academic and International Affairs) of Universiti Sains Malaysia, Professor Ahmad Shukri Mustapa Kamal for his unwavering support and Professor Dato' See Ching Mey for initiating the efforts to write the book.

I am most grateful to Professor Hanafi Atan, Deputy Director of Centre for Development of Academic Excellence for his encouragement, friendship and continuous support. Finally, special thanks to Miss Ashuwini Sridaran for her considerable assistance in preparing the manuscript and to Professor Rahmat Awang and his staff from the Informatics for Community Health, National Poison Centre for the excellent typesetting and production of the book.

Professor Abd Karim Alias

About The Authors

PROFESSOR ABD KARIM ALIAS

Dr. Abd Karim Alias is a Professor of Food Technology at the School of Industrial Technology, Universiti Sains Malaysia (USM) and current Director of the Centre for Development of Academic Excellence.

He joined USM in 1994 and over the last 18 years has taught most of the food science and food technology courses in the curriculum. He always aspires to be a good educator and researcher. Enthusiasm, commitment, and creativity are the three elements that best define him as a teacher. Dr. Karim believes that teaching is an exciting adventure in which both the teacher and the students participate and cooperate to achieve a common goal. He has great interest in using the Internet as an alternative medium for learning and teaching. He has developed and maintained a few teaching portals, websites, and blogs related to teaching/learning and research. Currently he is involved as a trainer in the technology-mediated learning workshop. In 2002, Dr. Karim received the inaugural USM Excellent Educator Award and in 2010 he received the Anugerah Tokoh (Distinguished Person) in Anugerah Sanggar Sanjung. He also was the recipient of the Anugerah Akademik Negara award (National Academic Award) in 2008 for teaching.

On the research front, Dr. Karim has published more than 90 papers in international citation-indexed journals and several book/encyclopaedia chapters. He also has published/presented more than 70 conference papers (7 of them as a keynote speaker). Dr. Karim is the recipient of more than 30 publication awards from USM. Under his supervision, 7 PhD and 30 MSc students have graduated. In addition, he has supervised three post-doctoral fellows. Currently Dr. Karim is supervising 9 MSc and 3 PhD students and 1 post-doctoral fellow. He is an editorial member of the Journal of Physical Science and Tropical Life Science Research (USM Publisher), the International Journal of Food Research (UPM Publisher) and Food Hydrocolloids (Elsevier).

PROFESSOR ZAINAL ARIFFIN AHMAD

Professor Zainal Ariffin Ahmad joined Universiti Tenaga Nasional (UNITEN) in October 2010 to head the Graduate Business School under the College of Graduate Studies. He took an early retirement from Universiti Sains Malaysia (USM), where he served for 16 years beginning in 1994. Previously, he served 5 years at Northern Illinois University as Program Coordinator (1989-1994) while completing his Doctorate in Education (EdD). Professor Zainal received the coveted Anugerah Akademik Negara award (National Academic Award) for teaching in 2008 from the Ministry of Higher Education and the USM Outstanding Educator Award in 2007. As an active researcher, he has conducted 26 research projects to date. He also was recently appointed as a Visiting Research Fellow at the University of New South Wales, Australia.

At USM, Professor Zainal served as the Principal Investigator in the Human Development Lab, School of Management, and in 2009 he headed the BRAIN (Business Research for Applied Innovations in Neurosciences) Lab, Graduate School of Business, USM. He also served two terms as Deputy Dean for Research and Graduate Studies at the School of Management, USM. He has supervised more than 26 PhD and DBA graduates to date. He supervises doctoral and master candidates in the areas of organisational behaviour, the brain and learning, and quality and human resource management. At the national level, Professor Zainal is an Associate Fellow with the Academy of Sciences Malaysia (ASM). Recently he was appointed as Chair of the Expert Working Group for Social Sciences and Humanities under the National Science and Research Council. He also is a panel reviewer for the Malaysian Qualification Agency and a grant reviewer for the Ministry of Science, Technology, and Innovation.

Professor Zainal also conducts seminars, workshops, and in-house training for academic, public sector, and corporate clients on skills-based training (e.g., managerial, communication, facilitation, presentation, supervisory, teamwork, networking skills). He also serves as an advisor to the Electronic Manufacturing Services Benchmarking Council under the Malaysian Productivity Corporation and is a frequent guest lecturer for the Malaysian Public Services Department. His clientele list includes Siemens, Otis, Sharp-Roxy, Bosch, FMM, Intel, Motorola, INTAN, Koperasi Tunas Muda Sungai Ara, and Jabatan Pembangunan Koperasi. Professor Zainal has co-written seven books and numerous articles published in international and national journals. He has served as an editor and reviewer for several international journals and has won two Best Paper Awards (in 2006 at the 5th Asian Conference of the Academy of Human Resource Development and in 2007 at the 3rd UNITEN International Business Management Conference). He is a member of the Academy of Management (USA), the Malaysian Institute of Management, and the Malaysian Institute for Human Resource Management.

PROFESSOR DATO'
DR. SEE CHING MEY

Ching Mey See (PhD) is a Professor at the Universiti Sains Malaysia (USM), Malaysia. She also is the Deputy Vice Chancellor of the Division of Industry and Community Network. Professor See is a prominent leader in the field of psychology, counselling, and special education.

Nationally, Professor See is the Secretary of the Association of Resource & Education for Autistic Children and a volunteer principal of Lions REACH, and she sat on the Lembaga Kaunselor (Board for Counsellors) in Malaysia from 2000 to 2012. She also is the founding President of the Penang Counselling and Psychology Association.

On the international front, Professor See is a Board Member of the Asia-Pacific Association of Psychotherapists, a Council Member of the National Board of Certified Counsellors International (NBCC-I), the Regional Director for NBCC Malaysia, an Executive Council Member of the International Association for Counselling, Regional Vice President for Asia of the International Play Association, and immediate past President of the Association of Psychological and Educational Counsellors of Asia-Pacific (APECA).

Professor See was awarded the Darjah Setia Pangkuan Negeri award and Pingat Jasa Kebaktian award by the Penang State Government; the Maal Hijrah Excellence Award (in the Academic Category) and the Excellence Service Award by USM; the Sin Chew Da Ai Award (Sin Chew Kind Heart Award); the Ohio State University Alumni Citizenship Award; and the Ohio State University Susan Sears Distinguished Alumni Award.

She has published 8 academic books and more than 100 international and national academic journal articles. She has also presented over 170 academic papers at national and international seminars and conferences on counselling, psychology, mental health, special education, and community engagement. Under her supervision, 9 PhD and 46 Masters students have graduated.

Professor See is the Chief Editor of the Journal of Counselling, APECA, and she is an Editorial Board Member of the Journal of Asia-Pacific Counseling, Korean Counseling Association; Rajanagarinda Institute of Child Development International Journal; Asia-Pacific Journal of Educators and Education; Philippine Journal of Counseling Psychology; Journal for International Counselor Education, University of Nevada; The Family Journal, Mississippi College; International Journal of the Scholarship of Teaching and Learning, Georgia Southern University; Hacettepe University Journal of Education; and International Journal of Interdisciplinary Social Sciences, University of Illinois Research Park.

ASSOCIATE PROFESSOR DR. AZMI SARRIFF

Dr. Azmi Sarriff studied pharmacy at the Universiti Sains Malaysia (USM) and graduated with a Bachelor of Pharmacy (BPharm) degree in 1982. In 1985, he graduated with a Doctor of Pharmacy (PharmD) degree from the University of Minnesota, Minneapolis, USA. Dr. Azmi then began his career in academia and currently is an associate professor in Clinical Pharmacy and head of the Discipline of Clinical Pharmacy at the School of Pharmaceutical Sciences, USM. He opted for teaching as his career because he likes to teach. His objective is to teach every pharmacy student to think 'like a pharmacist'. In 2009, he received the inaugural USM Excellent Educator Award from the university.

Dr. Azmi began writing in 1994 and published his first book titled 101 Questions About OTC Drugs (Utusan Publication, 1994). It was followed by Introduction to Drug Counseling (USM Publication, 1996) and Clinical Skills for Pharmacy Students: Toward a Pharmaceutical Care Practice (USM Publication, 2012). The latter text serves as a quick reference for pharmacy students during their clinical clerkship.

In short, Dr. Azmi's teaching goal is not only to deliver and transmit factual knowledge, but also, and more importantly, to transform his students into pharmacy practitioners through critical thinking, experimentation, and discovery learning. For him, good teaching is, and should be, good science.

PROFESSOR FAUZIAH MD. TAIB

Professor Fauziah Md. Taib is currently the Director of the National Higher Education Research Institute and a Professor in Accounting and Finance at the School of Management, Universiti Sains Malaysia (USM).

Professor Fauziah obtained her degree in BBA (Accounting) at the West Texas State University and completed her postgraduate studies in M.MAcc at Glasgow University and PhD (Accounting and Finance) at Lancaster University. Prior to joining USM in 1996, Professor Fauziah served as part of the Tenaga Nasional Berhad and Sime Darby Group and has been with Lancaster University. A stint in corporate life prepared her for the discipline, and she developed the commitment and dedication required to share her experiences in the classroom as an inspiring lecturer. Her teaching experience in the British Top Universities Accounting Programme at Lancaster University helped her to develop relevant teaching skills and academic content. She was honored with the Anugerah Pendidik Sanjungan award (Best Teacher Award) at USM in 2009.

Professor Fauziah previously was an associate researcher for the Institute of Chartered Accountants in England and Wales and the International Centre of Research in Accounting based in the United Kingdom.Organisations such as the Asian Development Bank; Ministry of Higher Education; Ministry of Science, Technology, and Innovation; Ministry of Health; Malaysian Accounting Standards Board; Penang Development Corporation; and Malaysian Royal Air Force Training Institute are among the organisations who benefitted from her prior work as a consultant and trainer.

Professor Fauziah believes that the learning experience is maximised once 'hearts are connected'. Connecting the heart and the mind is crucial in facilitating the learning experience for both lecturers and students. Thus, she advocates many teaching approaches with the ultimate objective of connecting the heart and the mind. Her passion for teaching includes coaching of research students. Fifteen PhD students have graduated under her personalised coaching, and these students have published many papers at the international and national levels.

Connected hearts make learning easy.

ASSOCIATE PROFESSOR DR. ROZINAH JAMALUDIN

Assoc. Prof. Dr. Rozinah Jamaludin is an Associate Professor at the Centre for Instructional Technology and Multimedia, Universiti Sains Malaysia (USM), Penang, Malaysia. She began her career as a mathematics teacher in the secondary school and then pursued her undergraduate degree at Universiti Putra Malaysia. She majored in Malay Language Studies and obtained her undergraduate degree in 1992. Dr. Rozinah then earned her Master Degree at Ohio University, Athens, Ohio, USA in 1993 majoring in Microcomputers in Education. She became a lecturer at USM in 1994. In 2001 she was awarded the International Postgraduate Research Scholarship from the Royal Melbourne Institute of Technology, Melbourne, Australia to pursue her doctorate; she graduated in 2004 after majoring in e-learning and web-based design and development.

To date, Dr. Rozinah has published the following books: Asas-asas Multimedia dalam Pendidikan (2000), Teknologi Pengajaran (2002), Multimedia dalam Pendidikan (2005), and Internet dalam Pendidikan (2007). She also was an editor of the books Governance and Leadership in Higher Education (2008) and Strategic Partnership and Alliances between Malaysia and CLMV countries (2012). Dr. Rozinah has written many book chapters, journal articles, monographs, proceedings, and magazine articles, and she has presented papers at national and international conferences. She also has reviewed many journal articles and proceedings.

Dr. Rozinah's passion is research, and she is an Associate Research Fellow for the National Higher Education Research Institute (NaHERI). Her most recent research project is titled 'Implementing a Virtual 3D Campus of USM using Second Life: Case For a CCIL-Based Distance Learning Package', which is funded by a Research University Grant. She also is working on 'The Establishment of Malaysian Branch Campuses Overseas' and is a project leader for the 'Strategic Positioning of Malaysian Branch Campuses Overseas' program of the Ministry of Higher Education Malaysia and NaHERI. Dr. Rozinah also leads projects in Cambodia, Laos, Myanmar, and Vietnam (CLMV) to provide e-learning readiness and training to lecturers in the CLMV countries. Recently, she was awarded a fellowship to conduct research in Seoul, South Korea under the ASEAN University Network funding.

Dr. Rozinah has supervised eight PhD students and many MA students and also has been an external examiner for both local and international students. In addition to her academic endeavours, Dr. Rozinah enjoys being close to nature and likes to do jungle trekking and hiking in all parts of the world.

DR. YOON TIEM LEONG

Dr. Yoon Tiem Leong was trained as a theoretical physicist at the University of Malaya and the University of Melbourne, Australia. He joined the School of Physics, Universiti Sains Malaysia (USM) in 2003 and is currently a senior lecturer and the first year coordinator there. Initially trained as a high energy physicist, Dr. Yoon is now exploring a field quite orthogonal to his own training: computational condensed matter physics (among other things, molecular dynamics simulations of atomistic systems and density functional theory calculations).

Dr. Yoon has taught a wide range of undergraduate physics courses, including engineering electromagnetism, electronics, engineering mathematics, linear algebra, calculus, mechanics, modern physics, thermodynamics, statistical physics, quantum mechanics, and, more recently, computational physics. To him, teaching physics to university students is a privileged assignment that gives him the opportunity to inspire abstract thinking in students' minds. Deeply inspired by the late legendry physicist Richard Feynman, Dr. Yoon believes that abstract physics or mathematics ideas can be explained in an understandable and interesting manner. He finds pleasure in making an otherwise messy piece of physics or a logical conundrum understandable to students by innovative explanatory tricks and funny anecdotes. For Dr. Yoon, lecturing about physics is a personal priority and a matter of conscience, and he spends a great deal of his precious time preparing quality lecturers and teaching materials. His effort and passion for making physics understandable were rewarded when he was awarded the annual USM Pendidik Sanggar Sanjung award for the pure science category in 2008.

DR. MELISSA NG LEE YEN ABDULLAH

Dr. Melissa Ng Lee Yen Abdullah is a senior lecturer at the School of Educational Studies, Universiti Sains Malaysia (USM). She pursued her basic degree in Arts and Education (First Class Hon) (1999) and was awarded the Fellowship Award by USM to further her studies. She obtained both a MEd (2002) and PhD (2005) in the area of Educational Psychology from USM. She is also an associate research fellow of the National Higher Education Research Institute, a think-tank for the Development of Higher Education at the Ministry of Higher Education, Malaysia.

Her research interests include learning and teaching at the higher education level and mental health issues among members of the university community. Dr. Melissa has authored several books and has published in numerous journals, including the Bulletin of Higher Education Research, International Education Journal, International Journal of Interdisciplinary Social Science, Literacy, Pertanika Journal of Humanities and Social Sciences, International Journal of Special Education, Journal of Research in Special Education Needs, Pakistan Journal of Psychological Research, Malaysia Journal of Learning and Instruction, and Jurnal Pendidik dan Pendidikan.

DR. YVONNE TZE FUNG TAN

Dr. Yvonne Tze Fung Tan is a lecturer in the Discipline of Pharmaceutical Technology at the School of Pharmaceutical Sciences, Universiti Sains Malaysia (USM). She has a Bachelor Degree in Pharmacy from the University of Wisconsin at Madison, USA; a Master Degree in Pharmaceutical Technology from USM; and a PhD in Pharmaceutical Technology from the National University of Singapore. Dr. Yvonne is registered as a pharmacist in both Malaysia and the USA. She has served USM for more than 30 years. In 2008, she received the inaugural USM Excellent Educator Award.

Dr. Yvonne's research areas include polymeric nanoparticle drug delivery systems; development, design, and evaluation of multiparticulate drug/herbal delivery systems; muco-adhesive and dermatological dosage forms; and formulation and evaluation of controlled release matrix and coated preparations. She has published more than 60 research papers in peer-reviewed international and local journals, and she has given more than 70 international and local conference oral/poster presentations. Under her supervision, 6 PhD and 11 MSc students have graduated. Currently she is supervising 3 PhD and 2 MSc students.

Dr. Yvonne has been an academic evaluator for the Malaysia Pharmacy Board for the Bachelor of Pharmacy (Hons) program in both public and private institutions since May 2005. She also has been an academic evaluator for the Malaysian Qualification Agency since 2008. She has evaluated more than ten Pharmacy Degree Programs and seven Diploma Pharmacy Programs in Malaysia. Dr. Yvonne served as the external examiner for Master and PhD candidates in the field of pharmaceutics at the Faculty of Pharmacy, University Teknology MARA from July 2006 to 2008. In addition, she is a member of the editorial board of the Asian Journal of Pharmaceutical Sciences and the Malaysian Journal of Pharmaceutical Sciences.

Part 1

Essentials of Teaching & Learning

PART 1
CHAPTER 1
TEACHING IN HIGHER EDUCATION INSTITUTIONS
Rozinah Jamaludin

INTRODUCTION

The definition of teaching is the sharing or imparting of knowledge and skills either through formal or informal methods of instruction. Epistemology refers to the study of knowledge and how learning is acquired, and it addresses questions such as: What kind of learning do we want our students to have? What are the modes of delivery of knowledge? How do we ensure that our students are learning via best practices, such as Student-Centred Learning (SCL), Problem-Based Learning (PBL), and Contextual Learning? As an instructor, what are the challenges to teaching and how do we face them? What are the ways in which technology can be used to facilitate more active student learning?

PARADIGM SHIFT IN TEACHING AND LEARNING

Over the last half century, the population has been shifting from the Baby Boomer Age (those born from 1946 to 1964) to Generation X (between the 1960s and 1980s) to Generation Y (also known as the Millennial or Net Generation, between 1981 and 1999) to Generation Z (between 1996 and 2009). During this evolution, the pedagogy of instruction has shifted from traditional teacher-centred to SCL, or in more popular terms, from the conventional to the constructivist classroom (Table 1).

Under the constructivist approach, students can work alone or in small groups and on and off campus according to their own suitable pace, time, and place. They have access to a wide range of learning resources in addition to the tutor and can enrol at

flexible times of the year. Students are encouraged to take ownership of their learning, become reflective learners, and become empowered and more motivated and committed to learning while also being able to work and learn in partnership (McLean, 1997; Educational Initiative Centre, 2004). Dialogues among students permit comment generation and hypothesis testing and allow students to both acquire new knowledge and comment on that knowledge, thereby attaining a higher level of understanding.

Table 1: Constructivist versus conventional classrooms

Conventional Teacher-Centred	Constructivist Student-Centred
● tutors seen as 'fountains of all knowledge'	● tutor's seen as having a 'facilitator' role
● students adopt a passive role	● students adopt an active role
● tutor led	● student led
● students taught following set syllabus	● negotiated curriculum
● fixed semesters or terms	● flexible student pattern
● learning restricted to the classroom	● learning not restricted to the classroom, time, place, and pace
● set classes each week	● group learning via action learning
● didactic	● utilise range of teaching methods

Tutors, as facilitators, guides, and mentors, may also work in a team and draw on the help of technicians, librarians, and other technical and support systems. Tutors can work with students to determine teaching and learning strategies and to develop the student's ability to become a 'researcher' and thus access multiple sources of information. University lecturers should be concerned with promoting learner independence and helping students achieve autonomy. Lecturers also should encourage learners to reflect on their work, evaluate their study habits, and participate in dialogue with peers and tutors; all of these factors are designed to promote autonomy and facilitate the kind of independent learning expected in higher education institutions (HEIs).

Tutors as
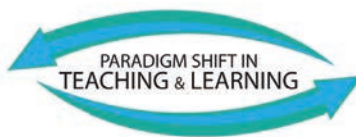"fountain of all knowledge"

Student
adopt passive role

PARADIGM SHIFT IN
TEACHING & LEARNING

Teacher led

Learning
restricted to classroom

Tutors as facilitator

Student
adopt active role

Student led

Learning not restricted
to time, place and space

Although HEIs already are able to attract non-traditional students and students from diverse backgrounds, this teaching method will widen the participation of HEIs in the community, provide the opportunity to improve bottom line performance, allow HEIs to gain an international reputation, and allow tutors to spend more time on research and attaining funding. Because of this paradigm shift, the National Higher Education Plan has set forth a plan to achieve best practices in teaching and learning in academia. This plan, called Pelan Strategik Pengajian Tinggi Negara (PSPTN), has four phases: Phase I (2007–2010) Laying the Foundation; Phase 2 (2011–2015) Strengthening and Enhancement; Phase 3 (2016–2020) Excellency in Higher Education; and Phase 4 (beyond 2020) Glory and Sustainability. The purpose of this PSPTN is to produce human capital with first class mentality and innovative knowledge for the country.

PHASE 1: LAYING THE FOUNDATION

Under Phase 1 of the PSPTN (2007–2010), one of the main goals of the changing academic profession is to improve teaching and learning. This involves increasing the number of graduate students, improving facilities in all HEIs to support the implementation of SCL, increasing the number of lecturers using SCL, developing a curriculum based on Outcome-Based Learning (OBE), and training non-academic staff by having them attend 2-day long teaching and learning workshops.

PHASE 2: STRENGHTENING AND ENHANCEMENT

We currently are in the second phase of the PSPTN (2011–2015). This phase involves revisiting our education system to make improvements that will produce graduates who are creative and strategic thinkers, leaders, and entrepreneurs; having these skills will better the country in the future. Therefore, the current focus is to improve the skill set of graduate students via use of appropriate methodology, improved implementation of SCL, use of best practices, sharing of teaching and learning techniques among HEIs, improved quality of programmes through creation of innovation, attainment of international recognition, and improved knowledge of the process of teaching and learning among non-academicians.Phase 3 and Phase 4 are yet to be implemented in the later years as was planned.

CURRICULUM DESIGN

Based on the National Action Plan mentioned above, curriculum design should be changed and should not look 'nice on paper' only. Currently, such changes have not been fully implemented and internalized by lecturers, and curricula seem to be just 'business as usual'. Curriculum design should be focused on learning outcome taxonomies that must include Program Educational Outcomes (POE), Program Outcomes (PO), Course Outcomes (CO), and Lesson Outcomes (LO), which cover cognitive, affective, psychomotor, and soft skills. Delivery and assessment methods and student learning time should emphasize constructivist SCL, which puts less focus on exams and more focus on challenging

and enabling students to be more independent. A number of taxonomies can be considered when preparing learning outcomes (Table 2).

Table 2: Taxonomies of Teaching

Tripartite (Hilgard 1980)	Gagne (1956)	Bloom (1956)	Revised Bloom, Anderson & Krathwohi (2001)		Anderson (1981)	Merrill (1983)	Reigeluth & Moore (1999)	Krathwohi, Bloom & Masia (1964)	Simpson (1972)
Cognitive	Verbal information	Knowledge	Metacognitive Knowledge	Remember	Declarative Knowledge	Remember verbatim	Memorize information		
	Concepts	Comprehension	Procedural Knowledge	Understand	Procedural Knowledge	Remember paraphrased	Understand relationships		
	Procedures & rules	Application	Conceptual Knowledge	Apply		Use generality	Apply skills		
	Problem solving	Analysis Synthesis Evaluation	Factual knowledge	Analyse		Find generality	Apply generic skills		
				Evaluate					
	Cognitive strategies			Create					
Affective	Attitudes							Receiving	
								Responding	
								Valuing	
								Organising	
								Characterising	
Psychomotor	Motor skills								Perception
									Set
									Guided
									Response
									Mechanism
									Complex
									Response
									Adaptation
									Origination

BLOOM'S TAXONOMY (1956)

In the 1950s, Benjamin Bloom developed the taxonomy of cognitive objectives. Bloom's Taxonomy is categorized as ordered thinking skills and objectives. His taxonomy follows the thinking process in that it says that 'You cannot understand a concept if you do not first remember it, similarly you cannot apply knowledge and concepts if you do not understand them'. It is a continuum from lower order thinking skills (LOTS) to higher order thinking skills (HOTS), as shown in Figure 1 and explained in detail below.
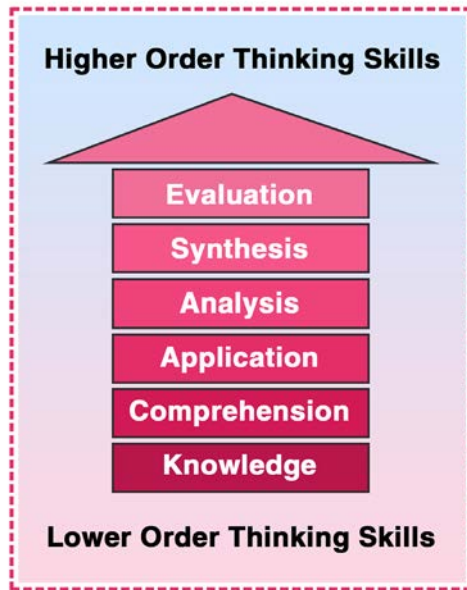
Figure 1: The first Bloom's Taxonomy (1956)

Knowledge

Knowledge refers to remembering or retrieving previously learned material. Examples of verbs that relate to this function are know, identify, relate, list, define, recall, memorize, repeat, record, name recognise, acquire.

Comprehension

Comprehension describes the ability to grasp or construct meaning from material. Examples of verbs that relate to this function are restate, locate, report, recognise, explain, express, identify, discuss, discuss, describe, review, infer, conclude, illustrate, interpret, draw, represent, differentiate, and conclude.

Application

Application is the ability to use learned material or to implement material in new and concrete situations. Examples of verbs that relate to this function are apply, relate, develop, translate, use, operate, organise, employ, restructure, interpret, demonstrate, illustrate, practice, calculate, show, exhibit, and dramatize.

Analysis

Analysis is the ability to break down or distinguish the parts of material into its components so that its organisational structure may be better understood. Examples of verbs that relate to this function

are analyse, compare, probe, inquire, examine, contrast, categorise, differentiate, investigate, detect, survey, classify, deduce, experiment, scrutinize, discover, inspect, dissect, discriminate and separate.

Synthesis

Synthesis refers to the ability to put parts together to form a coherent or unique new whole. Examples of verbs that relate to this function are compose, produce, design, assemble, create, prepare, predict, modify, tell, plan, invent, formulate, collect, set up, generalise document, combine, relate, propose, develop, arrange, construct, organise, originate, derive, and write.

Evaluation

Finally, evaluation is the ability to judge, check, and even critique the value of material for a given purpose. Examples of verbs that relate to this function are judge, assess, compare, evaluate, conclude, measure, deduce, argue, decide, choose, rate, select, estimate, validate, consider, appraise, value, criticize, and infer.

REVISED BLOOM'S TAXONOMY (2001)

In 2001, Anderson and Krathwohl revised the original Bloom's Taxonomy (Figure 2), and some of the steps in the continuum were altered.
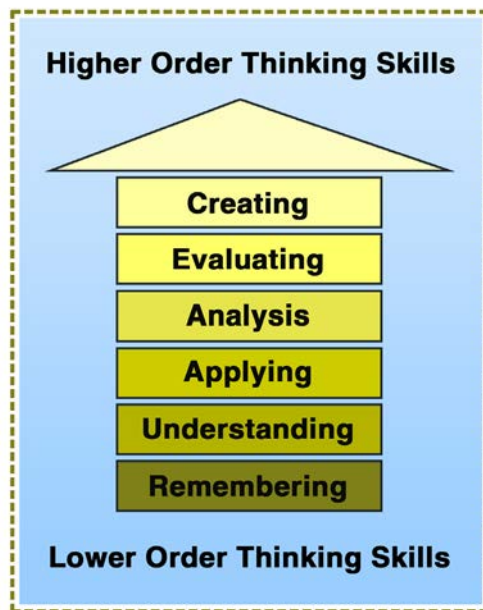

Figure 2: Bloom's taxonomy revised by Anderson and Krathwohl (2001)

Remembering

Remembering refers to retrieving, recalling, or recognising knowledge from memory. Examples of verbs related to this aspect are recognising, listing, describing, identifying, retrieving, naming, locating, and finding.

Understanding

Understanding means constructing meaning from different types of functions be they written or graphic messages. It includes activities such as interpreting, summarising, inferring, paraphrasing, classifying, comparing, explaining, and exemplifying.

Applying

Applying describes carrying out or using a procedure through executing or implementing. Applying refers to situations in which learned material is used through products like models, presentations, interviews, and simulations. Examples of verbs are related to applying are implementing, carrying out, using, and executing.

Analysing

Analysing refers to breaking materials or concepts into parts and determining how the parts relate or interrelate to one another or to an overall structure or purpose. Mental actions included in this function are differentiating, organising, and attributing, as well as being able to distinguish between the components or parts. When one is analysing, he/she can illustrate this mental function by creating spreadsheets, surveys, charts, diagrams, or other graphic representations. Examples of verbs associated with analysing are comparing, organising, deconstructing, Attributing, outlining, finding, structuring, and integrating.

Evaluating

Evaluating means making judgments based on criteria and standards through checking and critiquing. Critiques, recommendations, and reports are some of the products that can be created to demonstrate the processes of evaluation. In the newer taxonomy, evaluation comes before creating, as it is often a necessary part of the precursory behaviour that occurs before creating something. Examples of verbs related to this function are checking, hypothesising, critiquing, experimenting, judging, testing, detecting, and monitoring.

Creating

Creating refers to putting elements together to form coherent or functional whole or reorganising elements into a new pattern or structure by generating, planning, or producing. Creating requires users to put parts together in a new way or to synthesize parts into something new and different. This process is the most difficult mental function in the new taxonomy. Examples of verbs related to creating are designing, constructing, planning, producing, inventing, devising, and making. In the original Bloom's Taxonomy, this function was known as synthesis.

DIFFERENCES BETWEEN THE TAXONOMIES

Figure 3 summarises the differences between the two taxonomies. One of the things that differentiate the new model from the original one is that it lays out components nicely so that they can be considered and used. Although the levels of knowledge were indicated in the original work (i.e., factual, conceptual, and procedural), they were never fully understood or used by teachers because most of what educators were given in training consisted of a simple chart that listed the levels and provided the related accompanying verbs. The updated version has added 'metacognitive' to the array of knowledge types. Using a simple cross impact grid or table like the one below, one can match easily activities and objectives to the types of knowledge and to the cognitive processes (Table 3). It is a useful tool to use in assessing how instruction is actually imparting levels of learning.
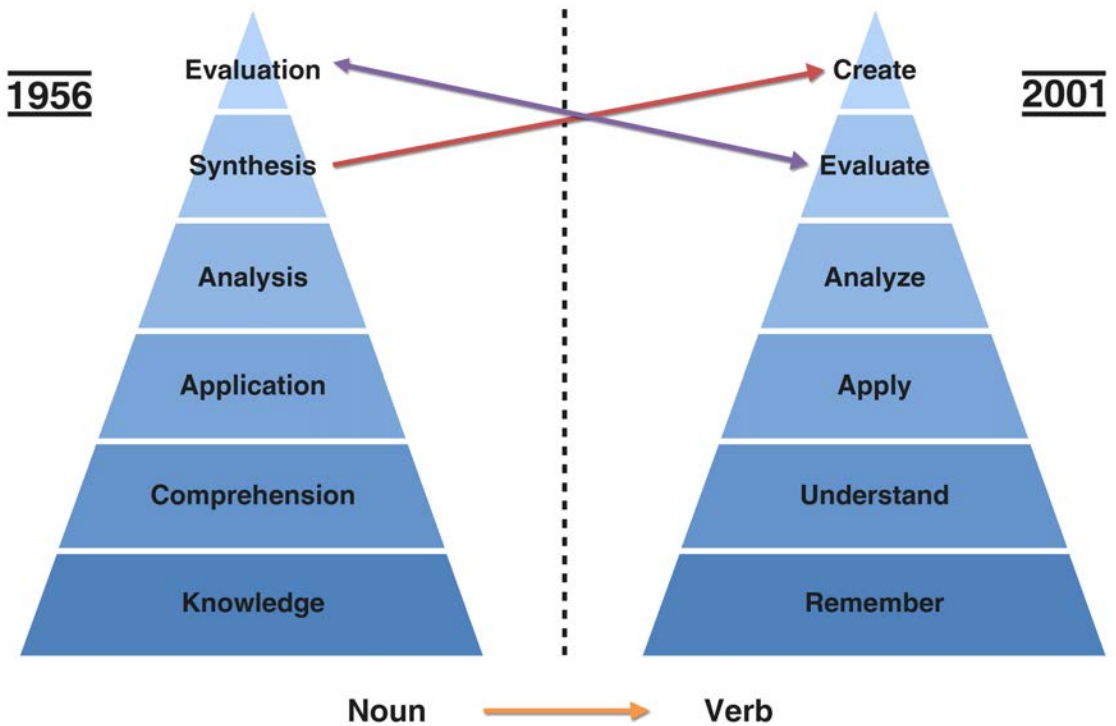

Figure 3: Summary of the differences between the two taxonomies

Cognitive Processes						
Knowledge dimensions	**Remember**	**Understand**	**Apply**	**Analyse**	**Evaluate**	**Create**
Factual						
Conceptual						
Procedural						
Metacognitive						

Figure 4 shows the knowledge dimensions such as factual knowledge, conceptual knowledge, procedural knowledge, and metacognitive knowledge. Factual knowledge is knowledge that is basic to specific disciplines and includes facts, terminology, details, or elements that students must know in order to understand a discipline or solve a problem in it. Conceptual knowledge is knowledge of classifications, principles, generalizations, theories, models, or structures pertinent to a particular disciplinary area. Procedural knowledge is knowledge that helps students to do something specific to a discipline (i.e., methods of inquiry, very specific or finite skills, algorithms, techniques, and methodologies). Finally, metacognitive knowledge is information or awareness of one's own cognition and particular cognitive processes; it includes reflective knowledge about how to go about solving problems and cognitive tasks, contextual and conditional knowledge, and knowledge of the self.
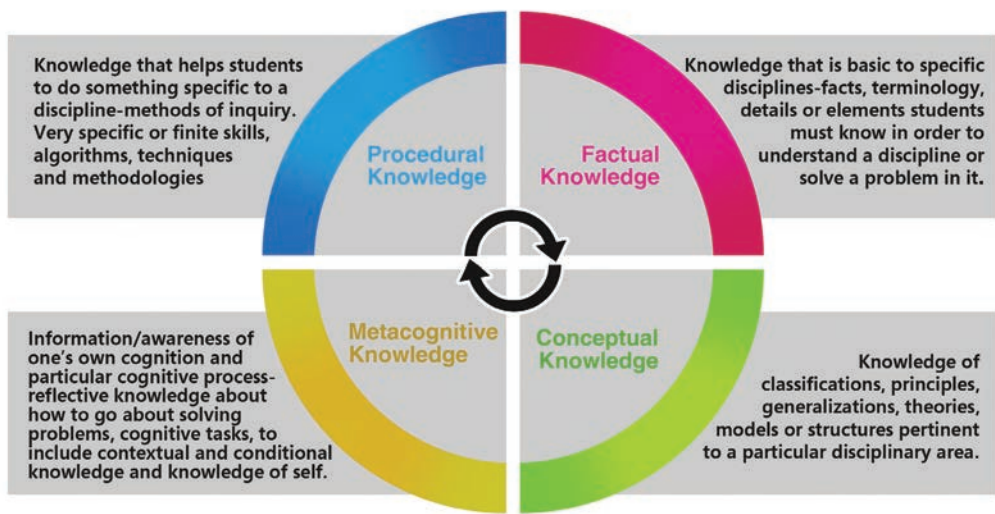
Figure 4: Knowledge dimensions

Most classroom instructors focus only on the levels presented in the cognitive domain, yet there are psychomotor and affective domains that should be considered as well. Education programs for physical education instructors, for example, often focus on the psychomotor domain, as this domain focuses on the acquisition of motor skills. Simpson's (1966) taxonomy focuses on the progression of a psychomotor skill from the guided response (i.e., doing what you are told to do) to the reflex or habitual response (i.e., not having to think about what you are doing) to origination as the highest level (i.e., invention of a new way to perform a task). She concludes that skill progression passes through seven phases. The first phase is the students' perceptions of an object. They will undergo sensory stimulation as they become aware of the object and thus interpreted actions lead to motor senses. Next, the students will be in a set phase in which they will be ready for a particular action or experience. They will adjust their mental, physical, and emotional states to prepare for the new experience. The third phase is the guided response phase; the instructor guides the students to follow a certain set of criteria, and imitation will occur. There will be a trial and error process until the required response is obtained. During the fourth phase, the learned response will become a habit, and learners will obtain confidence in the process. In addition, this habitual effect will become part of the students' responses when the same stimulus arises. In the complex stage, a movement pattern is required, and a motor act is considered to be complex. Next, the students will to adjust to certain movements when a different pattern arises. Finally, students will be able to originate or create new motor acts by manipulating materials using the skills, abilities, and understandings developed in the psychomotor area.

The affective domain seeks to define the way that we handle things emotionally. The affective domain is where a learner is aware, interested, and responsible and has the ability to listen and demonstrate certain characteristics in a particular situation. The affective domain model contains the following five levels: receiving, responding, valuing, organizing, and characterizing by value or value set. During the first stage, learners become aware of the existence of particular ideas and they will string along with those ideas. In the second phase, learners will respond to the phenomena or ideas with small measures. Next, they will value the ideas from simple to complex. In the organizing level, they will bring together the values and harmoniously combine them into a new value system. Lastly, the new internalized value will be applied as a part of the learner's value system.

CONSTRUCTIVISM

The constructivist theory is the theory that must be considered when we are talking about SCL. Constructivist epistemology is an epistemological perspective about the nature of scientific knowledge that was first used by Jean Piaget in 1967. Constructivists maintained that scientific knowledge is constructed by scientists and not discovered from the world. Constructivists claim that the concepts of science are mental constructs proposed in order to explain our sensory experience. Constructivism posits that there is no single valid methodology and that there are other methodologies for social science (i.e., qualitative research).

> Constructivists maintained that scientific knowledge is constructed by scientists and not discovered from the world.

Social constructivism contends that categories of knowledge and reality are actively created by social relationships and interactions. It is based on specific assumptions about reality, knowledge, and learning. Reality is constructed through human activity (Kukla, 2000). Knowledge is also a human product and is socially and culturally constructed (Prawat & Folden, 1994; Gredler, 1997; Ernest, 1999). Social constructivists view learning as a social process that becomes meaningful when individuals are engaged in social activities (McMahon, 1997). Cunningham, Duffy, & Knuth (1993) argued that constructivist learning environments are characterised by seven pedagogical goals. They suggest that constructivist learning settings are those which concurrently:

- provide experience in the knowledge construction process;
- provide experience in and appreciation for multiple perspectives;
- embed learning in realistic and relevant contexts;
- encourage ownership and voice in the learning process;
- embed learning in social experience;

- encourage the use of multiple modes of representation; and
- encourage self-awareness in the knowledge construction process.

Lebow (1995) presented five principles that he considers necessary to integrate the affective and cognitive domains of learning in ways that support constructivist principles of learning. He argued the need for learning environments to:

- maintain a buffer between the learner and the potentially damaging effects of
- instructional practices;
- provide a context for learning that supports both autonomy and relatedness;
- embed the reasons for learning into the learning activity itself;
- support self-regulated learning by promoting skills and attitudes that enable the learner to assume increasing responsibility for the developmental restructuring process; and
- strengthen the learner's tendency to engage in intentional learning processes, especially by encouraging the strategic exploration of errors.

Savery & Duffy (1995) argued that there are four principles that necessarily underpin learning in constructivist settings:

- learning is an active and engaged process;
- learning is a process of constructing knowledge;
- learners function at a metacognitive level; and
- learning involves social negotiation.

Grabinger (1996) provided a succinct list of the assumptions of learning that are aligned with contemporary constructivist views:

- people transfer learning with difficulty and need both content and context learning;
- learners are active constructors of knowledge;
- learning is cognitive and in a constant state of growth and evolution;
- learners bring their own needs and experiences to learning situations;
- skills and knowledge are best acquired within realistic contexts; and
- assessment must take more realistic and holistic forms.

Problem-Based Learning (PBL)

PBL is the type of classroom organisation needed to support a constructivist approach to teaching and learning. Savoie & Hughes (1994), who wrote about a process that they used to design a problem-based learning experience for their students, described the following actions for creating such a process:

- identify a problem suitable for the students;
- connect the problem with the context of the students' world so that it presents authentic opportunities;
- organize the subject matter around the problem, not the discipline;
- give students responsibility for defining their learning experience and planning to solve the problem;

- encourage collaboration by creating learning teams; and
- expect all students to demonstrate the results of their learning through a product or performance.

Such emphasis on learning has enabled students to take a self-directed approach to learning. Students are now researching material pertinent to the success of their academic career, and knowledge production is seen as a standard. In order for a teacher to veer towards a student-centred classroom, he or she must become aware of the diverse backgrounds of his or her learners. To that end, the incorporation of a few educational practices, such as Bloom's Taxonomy and Howard Gardner's Theory of Multiple Intelligences, can be very beneficial to a student-centred classroom because it promotes various modes of diverse learning styles. The following examples illustrate why student-centred learning should be integrated into the curriculum. It:

- strengthens student motivation;
- promotes peer communication;
- reduces disruptive behaviour;
- builds student-teacher relationships;
- promotes discovery/active learning;
- promotes responsibility for one's own learning.

Student-Centred Learning (SCL)

SCL is also known as flexible learning, independent learning, open/distance learning, participative learning, or self-managed learning. It focuses on the student's needs, abilities, interests, and learning styles, with the teacher acting as a facilitator of learning. It puts students first in the teaching and learning pedagogy. SCL requires that students be active, responsible participants in their own learning. Table 4 highlights some useful SCL activities.

Table 4: Activities in SCL

Outside the classroom	In the classroom
Independent projects	Buzz groups (short discussion in twos)
Group discussion	Pyramids/Snowballing (buzz groups continuing the discussion into larger group)
Peer mentoring of other students	Crossovers (mixing students into groups by letter/ number allocations)
Debates	Rounds (giving turns to individual students to talk)
Field trips	Quizzes
Practicals	Writing reflections on learning (3–4 minutes)
Reflective diaries, learning journals	Student class presentations
Computer-assisted learning	Role playing
Projects	Poster presentations
Writing newspaper articles	Students producing mind maps in class
Portfolio development	
PBL	PBL (less complex problems)
Case study	Case study (Simpler cases)
Modular approach	

In addition to PBL, case study, and modular, PoPBL (Project-Based Problem-Based Learning) other SCL approaches should be taken into consideration (Table 5).

Table 5: Other SCL approaches

Other SCL approaches	Definition of terms
Collaborative	Working together to achieve a goal, but in its negative sense it is working as a traitor
Contextual	Relating to, dependent on, or using context (e.g., contextual criticism of a book)
Cooperative	A business organization owned and operated by a group of individuals for their mutual benefit
Constructivist	A theory of knowledge that argues that humans generate knowledge and meaning from an interaction between their experiences and their ideas
Inductive	Of, pertaining to, or involving electrical or magnetic induction
Experiential	Pertaining to or derived from experience
Simulation	The imitation of some real thing, state of affairs, or process; the act of simulating something generally entails representing certain key characteristics or behaviours of a selected physical or abstract system

ASSESSMENT AND EVALUATION

Fair assessment of students in the university setting is challenging. The scope of assessment covers a wide range of different aspects of what the student is supposed to achieve. It includes giving a clear picture of the students' learning compared to the defined goals of education, allowing students to articulate their thoughts, measuring the LO, CO, and PO, and ensuring that instruction achieves every LO in the course. Basically, the curriculum should be less exam oriented. The results of the assessment must also serve as input to the university's quality assurance system (Hansen & Rosenørn, 2005). Furthermore, the assessment should be relevant to the way the teaching has been performed and to the way feedback has been given to the students throughout the course. A reasonable, fair, and just assessment in an examination requires careful planning of the exam so that it covers all subjects for all students. Assessment must have a good balance between the weight of the oral presentation, discussions, and, in the case of a project, the report. It is of utmost importance that *what* is assessed and *how* it is assessed is known by all involved parties (i.e., students, examiners, and external examiners) (Hansen & Rosenørn, 2005).

Evaluation/Assessment has the following scopes:

- proof of the student's learning level within a well-defined area (also for accreditation purposes);
- documentation that the student has acquired the competencies demanded by the labour market;
- documentation that the student has acquired the qualifications demanded by the authorities (the state);
- be a part of the university's quality development and quality control; and
- contribute to the student's motivation and self recognition.

Woods, et. al. (2000) described assessment in an article in *Chemical Engineering Education* as 'a judgment based on the degree to which goals have been achieved using measurable criteria and pertinent data'. This statement is operationalized through the following principles:

- assessment is a judgment based on performance, not personalities;
- assessment is a judgment based on evidence, not feelings;
- assessment should be done for clearly identified purposes and with clearly identified performance conditions;
- assessment is a judgment performed in the context of published goals, measurable criteria, and pertinent, agreed-upon forms of evidence; and
- assessment should be based on multidimensional evidence.

Typically, formative and summative assessments are the two most important elements used in assessing students. In the former, case outcome is used for feedback to both students and teachers to determine how learning is progressing. In the latter case, outcome is used to give grade/marks to the students at the end of a semester/course/program. Students and teachers see assessment from two different perspectives. However, if the curriculum is reflected in the assessment, then both the student and teacher are working towards the same goal. For the tutor, assessment is placed at the end of the teaching sequence, whereas assessment is placed right in front of the student's learning sequence (Ramsden, 1992).

CONCLUSIONS

This chapter defines teaching and describes the theories related to teaching in line with the second phase of the National Action Plan. In my humble opinion, which is based on being a lecturer at the university for the past 18 years, teaching is something unique. If you are passionate about teaching, it comes naturally. As time marches on, teachers must make changes and follow the latest trend so that we are not behind the times and just performing 'business as usual'. The paradigm has shifted, and today's children are not the same as the children of yesteryears; they require something more challenging, creative, and innovative. As lecturers, we need to accept this and make appropriate changes to our teaching techniques. Currently, the emphasis is on using SCL in teaching and moving from teacher-centred to student-oriented modes of instruction. Therefore, as lecturers or instructors, we need to understand what SCL is, how it should be implemented, and how we can improve the mode of assessment in teaching. Learning the theories and taxonomies of teaching will help us achieve these goals.

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CHAPTER 2
LEARNING AT HIGHER EDUCATION INSTITUTIONS
Melissa Ng Lee Yen Abdullah

DEFINITION AND THEORIES OF LEARNING

Human learning is an *intriguing area* of study. People have been trying to understand it for over 2000 years. Debate about how people learn began at least as far back as the ancient Greeks. It is necessary to conceptualise learning and to understand how it occurs because such knowledge underpins the way people learn, teach, and structure educational programs. Different learning theories propound different perspectives about instructional strategies that effectively promote learning. With the onset of scientific inquiry in the eighteenth century, behaviourism emerged as a theory that centred on observable behaviour: Learning was seen as changes in behaviour brought about by experiences (Deubel, 2003). Thus, a learner is assumed to be essentially passive and simply responds to the environmental forces. Behaviourism does not address how mental processes work in relation to learning. An implication of behaviourism for instructional design is the concept that learning is based on mastering a set of behaviours that are predictable. The strength of behaviourism is that when there are specific goals to be met, the learner is focused specifically upon achieving those goals whenever there are cues to prompt the learner's behaviour. However, because instructional design depends on having and maintaining the appropriate stimuli to sustain the intended learning behaviour, the desired performance may not take place when a certain incentive is not present. Such an instructional process is heavily teacher dependent.

Cognitive psychologists, on the other hand, contend that learning is not simply responding to stimuli from the environment. Instead, it is an internal and active mental process that develops within a learner. To understand the concept of learning, one

needs to examine the mental processes, such as memory, perception, and judgment that underlie it (Sweller et al. 1998). Learning develops when information is received, stored, and retrieved. Unlike behaviourism, which is environment focused, cognitive theory is learner focused. Thus, it is important for learners to efficiently process the information received. To learn effectively, for instance, students need to pay attention during lectures, organize the information, and review the learning materials. Learning only occurs when the information received make sense to the learner: 'Learning is meaningful only when it can be related to concepts that already exist in a person's cognitive structure. Rote learning, on the other hand, does not become linked to a person's cognitive structure and thus is "easily forgotten" (McLeod 2003: 39).

Behaviourism and cognitive theories are fundamentally different but not mutually exclusive. Conceptually, social cognitive theory provides a link between the two theories by acknowledging the influence of social environment on thinking (Schunk, 2001). As such, learning is described in terms of a reciprocal interaction among behaviour, environmental factors, and personal factors (Bandura, 1989). This theory proposes that a human can learn by observing others and one's own self. Observational learning requires paying attention to a demonstrated behaviour and having the motivation to imitate the modelled behaviour. The process also requires the learner to observe, monitor, and evaluate his/her own learning behaviour. In such processes, the learner's attitudes, goal setting, and self-efficacy are critical factors for successful learning. Humanistic theory also places emphasis on personal factors, particularly the development of values, self-concept, self-esteem, and motivation, and the need for learners to become fulfilled individuals (Maslow, 1968; Huitt, 2001; Ben-Harush, 2009).

The emphasis on the learner's role is also evident in constructivism, in which the learner is believed to constantly construct or create his/her own understanding and knowledge. Learning is considered to be an active process that is related to prior knowledge and subjective in nature. Thus, knowledge cannot be simply passed on from teacher to learner; instead, it must be constructed individually by each learner. Constructivism assumes that the learner's experiences, prior understanding, and social interactions play a role in learning (Boethel & Dimock 2000). Examples of constructivist learning include experiential learning, self-directed learning, and reflective practices. These learning strategies reflect the emphasis on the learner's roles in constructing his/her own knowledge within a social context. In summary, the concept of learning and the roles played by learners differ according to the different theoretical paradigms. Table 1 provides an overview of major theories of learning.

Table 1: Overview of major theories of learning

Theory	Assumptions	Primary Focus	Application of Principles
Behaviourism	Learning is a result of environmental forces	• Observable behaviour • Stimulus-response connections	• Have specific learning goals and objectives • Interact with the material while listening or reading (e.g., take notes, answer previously developed questions) • Reward self for learning activities and outcomes (e.g., listen to one song after 30 minutes of studying; go to a movie when attaining good grades in a course)
Cognitive Theory	Learning is a result of mental operations/processing	• Mental behaviour • Acquisition of knowledge • Intelligence • Critical thinking • Information processing	• Pay attention during lectures and reading • Review any reading materials before actually getting started to identify major terms and concepts • Pose different levels of questions to self when studying (e.g., low level -- what does this term mean?; higher level -- how could I use this concept or principle?; how is this concept similar or different from another?)
Social Cognitive Theory	Learning is a result of influences of social environment on thinking	• Social influences • Observational learning/modelling • Self-regulation • Attitudes • Goals setting • Self-efficacy	• Work in a study group to learn the material • Take action and then reflect on how successful the learning process is • Be confident in own ability to do well in a particular course • Set goals for learning the concepts or skills, not just making a passing score on a test • Plan own learning activities • Keep records of learning activities and reflect on which ones seem to work best; talk about these with other students
Humanistic	Learning is a result of emotion and goal-orientation	• Affect/Values • Self-concept/Self-esteem • Motivation • Needs	• Think about how learning relates to life goals or mission (e.g., to be a university graduate) • Make sure one feels comfortable during the learning processes; if stressed, take a few minutes to relax • Motivate self to be successful in an exam or presentation • Make learning fun
Constructivism	Learning is the result of the construction of meaning by the individual learner	• Mental behaviour • Developmental processes	• Review concept and reflect on how it is similar to prior knowledge or experiences • Avoid memorizing facts without genuine understanding • Try to apply the principle or think about how the concept can be applied • Work with another student to identify important terms, concepts, and principles

PARADIGM SHIFT IN LEARNING AT HIGHER EDUCATION INSTITUTIONS

From the 1920s through the 1960s, behaviourism swept from the arena of psychology into education with an air of authority that was astonishing (Brader-Araje, 2002). It was widely accepted and became a dominant approach in teaching and learning. Formal education was structured around the premise that teachers ought to provide the correct stimuli so that students can learn. According to the behaviourism paradigm:

- learning is passive;
- it is important for student to learn the correct answer;
- learning needs an external reward;
- knowledge is a matter of facts;
- understanding is a matter of seeing existing patterns; and
- teachers must direct the learning process.

The behaviourist movement places the responsibility of learning on the shoulders of the teachers. It is the teachers' role to ensure that learning takes place from the primary level up to higher education. Teachers were led to believe that they have to restructure the learning environment and determine the most appropriate reinforcement to optimize learning. The teaching and learning processes were very much teacher focused, with the aim of transmitting domain-specific knowledge and discrete skills. Such learning processes, however, are inadequate for preparing students for the real world, which is characterized by instability, ambiguity, and dynamic change. In other words, the mission of higher education is not to transmit information to students to prepare them for examination but to nurture them to learn and think.

In the early years of this new millennium, at the close of the 'Decade of the Brain' (1990-1999), an educational transition occurred; thinking moved from a reliance on metaphors about how people learn to an emphasis on pedagogies founded on cognitive development (Buckley, 2002). The transition placed more importance on students' learning outcomes and less importance on the quality of instruction. Teachers have a role to play in maintaining the student-centred learning environment, and curriculum design is based on the analysis of what students need to know to function in a complex world rather than what the teachers know how to teach. Thus, there has been a shift towards the cognitive and constructivism paradigms:

- learning is active and constructive in nature;
- students explore various possible response patterns and choose between them;
- learning can be intrinsically rewarding;
- knowledge is a matter of acquiring information;
- understanding is a matter of creating new patterns;
- applications require the learner to see relationships among problems; and

- students must direct their own learning.

Most educationalists would argue that one of the key roles of higher education institutions (HEIs) is to prepare university students to cope with the demands of the current labour market and to serve as the driving force for future development (Barnett & Hallam, 1999; Biggs, 1999; Brockbank & McGill, 1998. For these reasons, higher education ought to be oriented towards the student-centred learning paradigm, which focuses on lifelong learning and self-regulated learning skills. As mentioned by Barr & Tagg (2004), the mission, vision, culture, and structure of HEIs must undergo a paradigm shift from the instruction paradigm to the learning paradigm (i.e., from being teacher centred to being student centred) (Figure 1).

Under the instruction paradigm, HEIs aim to transfer or deliver knowledge from lecturers to students. Founded on this orientation, the institution offers courses and degree programs and seeks to maintain a high quality of instruction within them, mostly by assuring that lecturers stay current in their fields. If new knowledge appears, so will the offering of new courses. In the learning paradigm, on the other hand, the aim of HEIs is not to transfer knowledge but to create environments and experiences that allow students to discover and construct their own knowledge, understanding, and skills. It focuses more on the quality of learning for students individually rather than the quality of instruction per se (O'Brien, 2002).
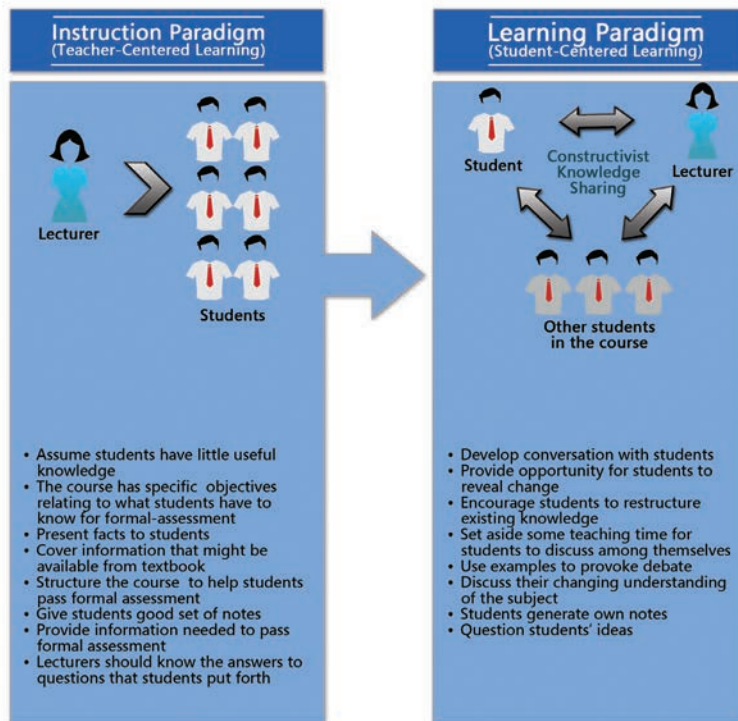
Figure 1: Teacher-centred learning and student-centred learning at higher education institutions; adapted from Trigwell & Prosser (2004)

This shift in paradigm from instruction to learning is in line with employers' and stakeholders' expectations that graduate students should demonstrate the abilities to learn new knowledge and skills on their own and also possess trans-disciplinary understanding, diversity of experiences, and problem-solving skills (O'Brien, 2002).

STUDENT-CENTRED LEARNING ACTIVITIES

Literature reviews of student-centred learning (Bertrand, 1999; Clark, 2009; Jacobson, 1999; Lea et al., 2003; Buchner et al., 2007; 'Jones, 2007) show that student-centred learning activities have specific key characteristics and common elements of implementation (Table 2).

Table 2 Student-centred learning activities

Key Characteristics	Common Elements of Implementation	Examples
• An emphasis on deep learning and understanding • Students organize knowledge in ways that facilitate retrieval and application • Increased responsibility and accountability on the part of the student • Increased sense of autonomy in the students in which they take control of their own learning: noting failures, planning ahead, apportioning time and memory to tasks • It emphasises learning independence and choice • It allows time for reflection • It emphasises higher-order thinking and permits the learner to apply subject material to new situations and synthesise new ideas • Sensory input is essential to for cognitive development • It emphasises time spent on task • The value of the learner is greater than that of the learning itself • Mutual respect within the student-instructor relationship • Students are encouraged to integrate socio-cultural elements in learning	• A classroom renovated to emphasise group work with 2–3 groups of 3–4 students each per table • Majority of class time is spent on learning activities done by groups of students • The activities tend to be short (5–20 minutes) and followed by a class discussion • All components of the class are tightly integrated • The instructor is more of a coach or a guide rather than the source of knowledge • Learning activities can be carried out independently, in pairs, or in groups after class hours • Learning activities focus on individual experiential learning	• Team work (3–4 students) • Peer mentoring • Hands on • Computer-assisted learning • Class presentations with activity intervals • Field trips • Dialog with instructor • Reflective diaries, logs, journals, and portfolios • Independent projects • Debates • Role playing

The following are examples of assessments which are in line with the characteristics of student-centred learning:

The concepts inventory

The concepts inventory is a short test taken by students at the beginning and end of the semester to measure increased understanding of basic concepts. Inventory questions should reflect concepts that the instructor hopes that student will learn by taking the course. A good inventory includes questions that address common misconceptions and focus on reasoning, logic, and general problem solving rather than facts, definitions, or computations. To develop a concept inventory, lecturers can begin by selecting the theories or concepts that are most critical to success in the subject area. Then, identify the common misconceptions that students have about those concepts, which could be based on observation, experience, initial assessment, discussion with students and so on (Faculty Development and Instructional Centre, 2011)

The minute quiz

At the beginning of class, it is valuable to give students a single-question quiz that assesses whether or not they have come prepared. With this system, the prepared students are preferentially rewarded. At the end of the semester all of the quiz scores are summed to account for a significant portion of the course grade, which is an added incentive for students to come to class prepared.

Collaborative exams

For a real learning experience, an exam may be offered in three phases: individual, team, and class. By the time the class period is over, students have taken the exam three times and know their final score. Individual effort is preferentially rewarded, yet students still get the valuable experience of working together as a team. Furthermore, with such a format, the instructor is able to fill the exam with intriguing but tough questions. If each student has access to a computer, the paper-based assessment can be replaced by online delivery, which assists with the intensive instant grading.

Self-assessment and peer reviewing

Students are allowed to play a role in their own assessment. Peer reviewing and grading should also be utilized. Students are frequently given the opportunity to assess their instructor and their classroom as well.

Appeals

End-of-semester course evaluations reveal that a top concern of most students is whether or not the course was fair. To satisfy this need, students may be permitted to appeal any question for which they believe they deserve credit.

DR. STRICT-A-LOT
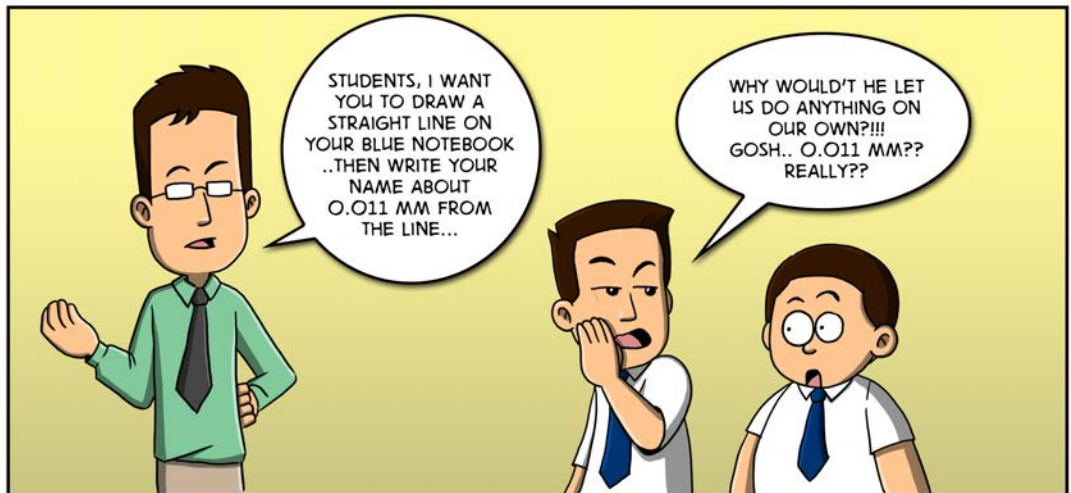
UNDERSTANDING LEARNERS AT HEIS

Greater emphasis on student-centred learning implies that lecturers should understand the characteristics and needs of students in the higher education setting. This is because the effectiveness of teaching depends largely on the nature of the learner, which includes the following characteristics (UNESCO Harare, 2010):

- demographics (e.g., age and gender);
- psychological characteristics (e.g., motivation and self-concept);
- sociological characteristics (e.g. friendship and social linkages);
- cultural background;
- religious affiliation;
- quality of preparation at the secondary school level; and
- marital status and family background.

It is probably a tall order to ask the lecturer to know these characteristics for every student in a course. For instance, it is obviously a steep task in an undergraduate class of 200 for a 14-week teaching term. Nevertheless, it is possible to gain an understanding of the general profile of the class based on these characteristics. Armed with these profiles and with the knowledge of outlying cases, the lecturer can then meaningfully plan and implement a more effective course of instruction for students (UNESCO Harare, 2010).

THE LEARNING CYCLE IN HEIS

With the expansion of higher education in many countries and the increasing emphasis on diversity, retention rates, and student-centred learning, there are good reasons to look into effective learning styles at HEIs. David Kolb's experiential learning cycle is one of the best known educational theories in higher education (Healey & Jenkins, 2000). The theory appears to offer a valid and plausible framework for experiential learning. Some of the appeal of the theory is that it provides a rationale for a variety of learning methods, including independent learning, learning by doing, work-based learning, and problem-based learning, which have recently received much attention at the higher education level. Regardless of the different learning methods, the fundamentals of student-centred learning may be increased through the use of Kolb's Model of Experiential Learning (Kolb, 1984). This cycle has been influential in curriculum planning, the popularity of active learning, and the identification of the specific learning orientations of undergraduates. Kolb's theory points to the diversity of learner styles and the significance of different learning strategies. Kolb's model describes the learning processes as falling into four quadrants:

1. Concrete Experience (CE): actively doing and activity;
2. Reflective Experience (RO): thinking about what was done;
3. Abstract Conceptualisation (AC): generalizing from specific experiences; and

4. Active Experimentation (AE): practicing new/alternative behaviours.

According to Kolb (1984), the learning cycle begins with immediate or concrete experiences that provide a basis for observation and reflection. Next, the student conceptualises or masters the key ideas, which may arise from the reflective process. This leads to the next stage, which is to synthesise the experience, reflect on what has been learned, and assimilate the information into abstract concepts that will produce new implications for action. This process leads to action, which can be tested and in turn create new experiences. The iteration of the learning cycle ultimately leads to a growth in knowledge, depth of understanding, and improved practice (Figure 2). Ideally, this process represents a learning cycle or spiral. Based on the four-stage learning cycle, four distinct learning styles have been identified. This indicates that Kolb's model offers both a way to understand individual's learning styles and also an explanation of a cycle of experiential learning that applies to all.
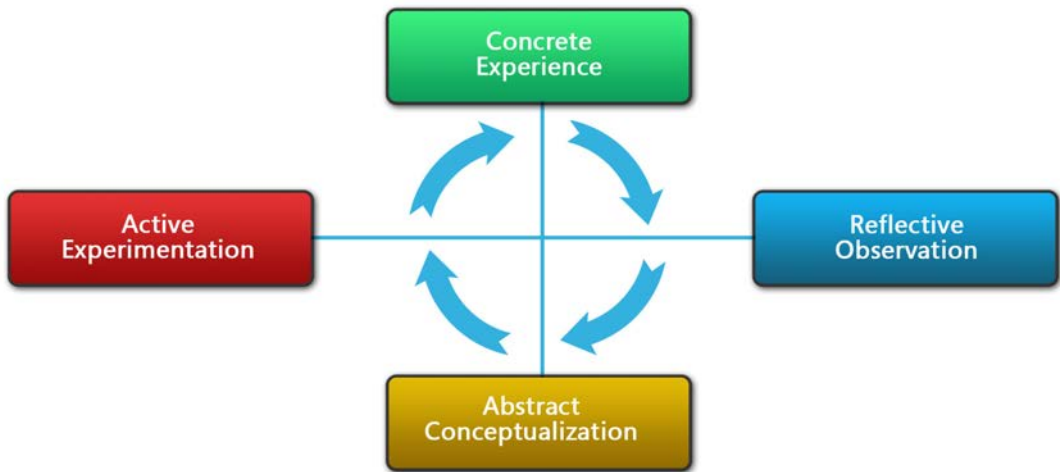
Figure 2: Kolb's learning cycle; adapted from Kolb (1984)

● While all four of these quadrants are involved in the learning process, students usually demonstrate a preference for one or two of the quadrants over the others. Historically, teaching and learning processes at HEIs, particularly for the arts, humanities, and social sciences, usually are thought of as synonymous with attending many lectures in which theoretical information is presented. This approach corresponds to Kolb's conceptualisation quadrant. Some courses with practical-based activities, such as medical degree program, provide opportunities to explore beyond the conceptualisation quadrant, thereby corresponding to the concrete experience and active experimentation quadrants. Hence, attempts must be taken to design learning activities that encompass all four quadrants. This is because Kolb's learning cycle not only enhances abstract conceptualisation but also promotes skill-based, practical, critical, and reflective areas in the learning processes (University of New South Wales, 2009). The following are recommended principles when applying educational theory into instructional practices (Ti et al., 2006): the learner should be an active contributor;

● learning should closely relate to real life problems;

- the learners' current knowledge should be taken into account;
- learners should use self-direction;
- learners should have opportunities for practice, self-assessment, and feedback;
- learners should be given the opportunity to self-reflect, and
- the use of role models.

LEARNING APPROACHES

Literature reviews show that there are three types of learning approaches: surface, deep, and achieving (Biggs, 1987, 1993a, 1993b). In the surface approach, the student's motive to learn is to carry out the task because of external positive or negative consequences (e.g., to satisfy the course requirement or to fulfil the family or society's requirement to obtain the necessary qualification). A typical surface strategy is rote learning, and surface-motivated students focus on what appears to be the most important items and then he/she memorizes them. Because of this focus, students do not see interconnections between the meanings and implications of what is learned. In other words, meaningful learning may not occur. The deep approach, on the other hand, is grounded by a deep motive that is based on internal motivation or curiosity. In the deep approach, there is a personal commitment to learning, which means that the student relates the content to his/her own individual meaningful contexts or to existing prior knowledge. Deep processing involves processes of a higher cognitive level than rote learning (e.g., searching for analogies, relating to previous knowledge, and theorizing about what is learned). Lastly, the achieving approach is focused on the product (winning an award). The strategy is to maximize the chances of obtaining high distinction. While this hopefully involves a high level of effort to learn the topic (like the deep strategy), the learning is the means, not the end. Table 3 shows the characteristics and outcomes of the three learning approaches (Biggs, 1987, 1993a, 1993b).

According to Leong & Battens (2002), while the deep and achieving learning approaches appear to be most desirable in the learning environment, the surface approach is generally driven by society. The key to success is a balance of all three motivations and strategies. Leong & Battens (2002) sampled a total of 475 students from the National University of Singapore using a 42-item questionnaire. Results showed that there were 174 students with deep motivation, 169 with surface motivation, and the remaining 132 students had achieving motivation. Thus, more than one-third of the students were deeply motivated to learn. These learners are believed to show interest from within and often have the initiative to go beyond their syllabus to satisfy their thirst for knowledge. About 35% of the students were surface motivated in their approach to learning. Their first and foremost objective for pursuing tertiary education is to obtain a degree, which will land them a reasonably comfortable and well-paid job. The findings are not surprising, as paper or academic qualifications are highly desirable in most societies. Nevertheless, the shortcoming of this approach is that students tend to be less interested in most of the knowledge that they acquire at the university. In fact, they learn just enough to pass, and they are afraid of failure because of social pressures. The remaining students who were achieving motivated wanted to do well in their studies. These students generally perform well on test and exams even though they may not have

deep understanding or interest in a particular subject. In fact, their over competitive learning behaviour may lead to being isolated from other students (Leong & Battens, 2002).

Table 3: Learning approaches

Learning Approach	Characteristics	Outcomes of Approach	Strategies for Learners
Surface	- Learn without deep understanding - See study as a requirement of the family/society that you must meet - See the main goal and value of learning as getting a qualification - See parts of learning tasks as unrelated to each other - Do not personally relate to the learning tasks	- Have limited understanding of theoretical concepts and principles - Cannot distinguish between examples from principles - Have difficulty in developing a logical argument - Cannot recognize key ideas - Forgetting things learned very quickly	- Use study skills to achieve better grades - Try to develop an interest in the subject by looking for connections to everyday experiences - Discuss what you learn everyday with classmates
Deep	- Learn with the intention to understand - Relate previous knowledge to new knowledge - Integrate knowledge from different subject areas - Relate theoretical ideas to everyday experiences - Distinguish between concepts and examples - Define own goals and pursue them in one's own way	- Have long term retention of knowledge - Able to apply knowledge to new situations - Able to generate new meanings and novel ideas - Become an independent learner	- Need to check frequently that your own goals are in line with the course objectives - Check with the teachers if you think you may be off-track
Achieving	- Mainly interested in getting high marks - Are deliberate and careful in planning their study - Plan scheduled study times - Have organized note-taking methods - Practice exam questions to maximize scores - Stick closely to the syllabus	- Generally perform well on tests and exams - May become too competitive, which can lead to being isolated from other students - May not be able to form deep understanding and interest in a subject	- Very seldom can a person learn on his/her own; collaborating with all kinds of classmates can enhance your learning - Develop a deep approach if you want to pursue higher education

Keck et al., (2007) examined the effects of learning approaches on students' achievement, mental health, and self-directed learning at the university level. Using path analysis, they discovered that the surface learning approach was related to low academic achievement scores, poor mental health, and low self-directed learning readiness levels. The study sampled 392 undergraduates at a private medical university in Malaysia. In contrast, the deep learning approach was related to students' great interest in university studies, a high level of self-directed learning readiness, and good mental health. In addition, students who subscribed to the deep approach also demonstrated high self-efficacy and positive perceptions

ACHIEVING

LEARNING APPROACH

> Interested in getting high marks
> Plan their study
> Plan scheduled study times
> Organized note taking methods
> Practise exam questions
> Stick closely to syllabus

SURFACE

> Learn without deep understanding
> See studying as a requirement of the family / society that you must meet
> Main goal is to acquire qualification
> See parts of learning tasks as unrelated to each other
> Do not personally relate to the learning tasks

DEEP

> Learn with the intention to understand
> Relate previous knowledge to new knowledge
> Integrate knowledge from different subject areas
> Relate theoretical ideas to everyday experiences
> Distinguish between concepts and examples
> Define own goals and pursue them

of the learning environment. The positive and better quality processes and learning outcomes were explained by the adoption of deep approaches, whereas the poorer outcome was attributed to the adoption of surface approaches. With the view that learning approaches have significant educational implications on students' learning, achievement, and well-being at HEIs, efforts should be taken to promote the adoption of deep learning approaches. In other words, university students should subscribe to meaningful learning versus the surface approach, which constitutes mere rote learning and is extrinsically motivated in nature.

SELF-REGULATED LEARNING

According to Attwood (2009: 1), '"Learning how to learn" is the single most important teaching objective for universities as they prepare students for a twenty-first-century version of Darwin's survival of the fittest'. In other words, having the motivation to learn and to do well may not be adequate for undergraduates; they must also have the skill to regulate their own learning activities, which is congruent with the paradigm shift towards student-centred learning at HEIs. Students must know how to learn. To do so, they have to be equipped with self-regulated learning skills. Self-regulated learning is the processes by which individual learners attempt to monitor and control their own learning processes. It is a developmental process that will gradually increase with scaffolding from the lecturers during the instructional practices. Students' self-regulated learning is reflected by their usage of cognitive, met cognitive, and resource management strategies (Figure 3).

Figure 3: Characteristics of students' self-regulated learning

Numerous studies have found that self-regulated learning skills produce positive learning outcomes among undergraduates. In the Malaysian context, Mohr Konini (2007) found that self-regulated learning predicts academic achievement among undergraduates. A total of 460 second-year engineering undergraduates from the University Technology Malaysia participated in the study. Academic achievement was measured by students' grade point average, whereas self-regulated learning was gauged by the Motivated Strategies for Learning Questionnaire. The results showed that self-regulated learning was a significant predictor of Malaysian undergraduates' academic achievement. This finding is in line

with results of many past studies. For example, Hark (2006) conducted a study of 165 undergraduates to examine their self-regulated learning strategies for time planning and self-monitoring. Time planning involves time management, scheduling, and planning one's study time. Self-monitoring, on the other hand, involves setting goals, focusing attention, and monitoring study activities. The results showed that students who were better time planners and who had better self-monitoring skills were more efficient in allocating their individual study time, prepared more appropriately for the tutorial group meeting, and achieved higher scores on cognitive tests. As supported by past literature, self-regulated learning has great potential in improving the quality of students' learning. The principles of self-regulation, thus, should be incorporated into higher education instructional design. Curricular reforms also are needed to promote the development of more independent, autonomous, and efficient learners.

Picture courtesy of Centre for Instructional Technology & Multimedia

CONCLUSION

Movements to consider students' learning approaches, learning outcomes, learning experiences, improved assessment, and the institutional mission towards student-centred learning are increasingly gaining prominence. This reflects a systemic shift in paradigms away from the instruction paradigm towards the learning paradigm. Although the student-centred learning paradigm is not a new concept, implementation of these revised pedagogical strategies, with much greater emphasis on the learners' roles as opposed to the lecturers' roles, requires instructional transformation at HEIs. At the core of the paradigm shift is the changes in student–lecturer relationship. Lecturers need to provide greater autonomy and opportunities for students' to self-regulate their own learning, voice their views, generate original ideas, and even challenge and debate during the learning and teaching processes.

There is an obvious need to increase the responsibilities and accountability of the students in their quest for knowledge. In fact, students should be encouraged to adopt the deep learning approach so that meaningful, active, and experiential learning can take place. Such changes are in accordance with the learning paradigm being promoted at higher education:

> *A paradigm shift is taking hold in American higher education. In its briefest form the paradigm that has governed our colleges is this: a college is an institution that exists to provide instruction. Subtly but profoundly we are shifting to a new paradigm: a college is an institution that exists to produce learning. This shift changes everything.*
>
> (Barr & Tagg, 2004: 1)

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CHAPTER 3

EFFECTIVENESS OF TEACHING AND LEARNING IN HIGHER EDUCATION

See Ching Mey

INTRODUCTION

Teaching and learning are the necessary facets of higher education. With the present pressure on faculty members to conduct research and publish their findings, teaching has become a lower priority. However, to ensure that we have productive and efficient human resources for the future, faculty members need to recognise their important role in imparting knowledge to students, who are there to learn. Thus, teachers and students represent two essential halves of a symbiotic relationship. Both teaching and learning must be effective for both parties to achieve productive gains. Numerous studies have been conducted to analyse and define effective teaching and effective learning. In this chapter, the criteria required for effective teaching and learning are described. Furthermore, ways to evaluate the effectiveness of learning and teaching through appropriate assessments are discussed.

EFFECTIVE TEACHING

Teaching has always been a challenging profession and changes both within and outside the teaching environment has made it more complex. To teach in more effective ways, faculty members must use appropriate methodology; demonstrate, encourage, and motivate students; and show concern for students. Such an approach will leave students with a lasting and very clear mind set of having benefited from the instruction. Therefore, teachers must constantly search for ways to improve their teaching methods and styles, with the goal of producing capable students who can successfully learn and apply the knowledge given to them. Effective teaching can be defined as 'that which produces beneficial and purposeful student learning through the use

of appropriate procedures' (Centra, 1993, as cited in Sajjad, 2010). Braskamp & Ory (1994) defined effective teaching as the 'creation of situations in which appropriate learning occurs; shaping those situations is what successful teachers have learned to do effectively' (as cited in Sajjad, 2010). In both definitions, learning cannot be separated from teaching, which demonstrates the fused nature of the two components. Similarly, both definitions speak of the need for faculty members to create 'procedures' and 'situations' that make the learning environment stimulating and exciting for the student as a learner. Another definition of effective teaching is that it is a conscious stream of good decisions that are made before, during, and after instruction to ensure the probability that learning will take place and knowledge will be retained. Again, this emphasizes that learning will occur if relevant teaching skills are used. Effective teaching involves the ability to integrate research findings into teaching, and it also combines human relations skills, judgments, intuition, knowledge of subject matter, and understanding of learning into one unified act, resulting in improved learning for students (From Learning to Teaching, 2008). In reality, effective teaching requires numerous skills that teachers must work hard to develop and acquire. A number of criteria and dimensions of effective teaching have been identified, and several of these are described in the following sections.

Criteria for effective teaching

Have a good command of the course content—Faculty members must have an excellent command of the course content that they intend to impart to their students. They should teach only about their areas of expertise. By being experts of their course material, teachers develop confidence within themselves, increase their knowledge of the course material, and stay up to date. They must also be capable of organising the course content into feasible and clear topics so that ideas and knowledge can be taught with clarity and accuracy.

Use an outcome-based instructional orientation—Effective teaching focuses on the outcomes of learning set by the faculty and students so that students can focus their attention on clear learning goals (Bulger, Mohr & Walls, 2002). The outcomes inform them of where they are going and how they will get there. Furthermore, learning outcomes enable teachers to assess students' progression and achievement as a measure of their own teaching effectiveness. Faculty members need to know whether the students have learned the material and whether the instructional strategies used helped the students to accomplish the stated outcomes.

Exhibit clarity of instruction—Effective teaching involves clarity of instruction (Bulger et al. 2002). Basically, teachers must provide students with highly explicit directions and explanations concerning the course content. Instructions that lack clarity during delivery to the students can cause confusion and result in frustration. If the content matter is complex and difficult to learn, teachers need to use clear illustrations or demonstrations to supplement and clarify difficult concepts.

Be flexible—Everyone learns in different ways. Faculty members must understand this and adapt to their students' learning styles by presenting information using many different formats and means. For example, content could be presented in lecture format, using audio and visual means, and via peer group discussions. By varying teaching styles and presentation, students can develop further interest

in the subject and better understand the course content.

Convey and generate genuine interest—Teachers who show great interest and enthusiasm in their course content can convey and generate great interest from their students (Hativa, Barak & Simhi, 2001). Students are aware of their teachers' perceptions towards the material being taught. Faculty members who exhibit genuine interest and passion when teaching and who make a serious effort to impart their knowledge tend to motivate students to learn.

Create a positive environment conducive to learning—Creating a positive environment that is conducive to learning can greatly affect students' ability to concentrate and focus on the content being presented. Teachers must continuously provide positive encouragement to their students, be clear, and offer positive criticism and ideas for improvement. By creating a safe, open, and trusting environment, students will feel comfortable and enjoy learning. Students will be able to open up to their teacher regarding their concerns or difficulties with the content. A positive learning environment provides a platform that facilitates happy and fun learning between the teacher and students.

Engage with students—Effective teaching requires students to engage and participate. This criterion suggests that students learn by doing. Teachers must create a dynamic educational environment that encourages students to practice the concepts they have learned (Bulger et. al., 2002). This engagement should begin early in the lecture and continue throughout the entire lecture. Furthermore, engagement and participation are intended to facilitate the development of the knowledge, skills, and attitudes that will enable the students to accomplish the learning outcomes (Bulger et al., 2002). Teachers need to create occasions during the lecture to encourage the students to be actively engaged in the learning process.

Engage in ongoing evaluation and professional development—Faculty members who are dedicated to continual self-improvement will learn and see things from different perspectives. They can use their knowledge and experience to enhance teaching effectiveness and student success (Smittle, 2003). Teaching is a learned process that is continually undergoing changes, particularly with the advent of technological improvements that can be applied into the classroom setting. Teachers must also constantly evaluate themselves and their teaching methods to gauge whether or not they are effective in the classroom and whether or not their students are learning. Those who constantly self-reflect, self-evaluate, and adapt and improve their teaching will become great teachers.

Additional tools for effective teaching

The items listed above in no way constitute an exhaustive list of the criteria faculty members must possess in order to teach effectively. Indeed, many sources list different criteria. For example, Hativa et. al. (2001) list 'four main dimensions of effective teaching' and Smittle (2003) recognises 'six main principles of effective teaching.' In addition, no single criterion works well as a separate, distinct entity, and there is quite a bit of overlap among the different criteria. Teaching usually requires patience in order to meet and respond to students' needs and to get everyone involved in the learning process. The following methods can be used to ensure effective teaching:

Show and tell (presentations by students)—The show and tell method often is used in the practical teaching. This method requires the student (or group of students) to explain a concept to other students to help them understand it (Counter, Balaraman, Lacey & Hochgraf, 1996). Thus, the role of the student is changed to that of a teacher, and the teacher only provides guidance and monitoring during the learning process. As an example, students can be asked to use a slide show and/or computer to present their information about an issue or problem to the rest of the class. The purpose of this method is to challenge the students to come up with a creative solution to the problem and to enhance their critical thinking (i.e., ability to think outside the box). To avoid embarrassing situations and to ensure that the demonstrations are useful to the entire class, the teacher should review the contents of the presentation before it is presented to the class.

Case studies—A case study is often used to encourage students to give an account of an actual activity, event, or problem that contains some of the background and complexities that they will encounter in their future working life (Counter et al., 1996). Because case studies are real-life scenarios, they help students understand and relate what they learn to the real world. Case studies involve the use of concepts from multiple disciplines and many related issues. Moreover, they promote discussion and feedback from the students. Case studies can be included at all levels of the curriculum. Although faculty members often encounter difficulty finding cases that are suitable to the topic they are teaching, with a little extra effort (searching or asking others), it should not be too hard to find a relevant case study.

Guided design projects—Teachers can assign a project to be completed over the course of a semester, thus giving students the opportunity to work as a team to apply what they have learned (Counter et al., 1996). Guided design projects aim to bring practical design experience into the lecture hall. Such projects are appropriate at any level, but they usually require a lot of preparation by the teacher. One of the best ways for students appreciate the industrial design methodology is to have them redesign and modify existing ideas or projects (Counter et al., 1996). In this way, students experience the design process. In addition, faculty members must consider the scope of the project and the goals for the students. The scope of the project must be reasonable, and care must be taken to ensure that the students are not overloaded. If necessary, the project can be divided into sections that can be worked on and during the semester.

Flowcharts—Flowcharts are useful tools, as teachers can organise the flow of logic and thought systematically, then present the flow of contents between various units of a complicated concept. This is an effective way of presenting information in a lecture hall, as students can see and understand concepts better.

Brainstorming—Brainstorming is used to encourage students to generate ideas in an unhindered manner (Counter et al., 1996). Brainstorming encourages students to participate actively in idea-generation exercises and experience benefits of a multi-dimensional approach to analysing problems or solutions. Brainstorming is applicable in labs, lectures, and discussion sessions. It is especially useful in courses that require generation of multiple answers from multiple dimensions rather than the usual single-answer approach to problems (Counter et al., 1996).

The advantage of this method is that all students have an equal chance to participate. When conducting a brainstorming session, the teacher must make sure that everyone agrees on the topic or issue being

discussed. Next, he/she needs to write down every idea on a flip chart, blackboard, or other visual display. It is important that the teacher does not allow students to reject or criticise ideas initially, and ideas should not be weeded out until the brainstorming session is completed. This is a preventive step to keep the idea or solution path from becoming narrowed or limited.

Question-and-answer method—The question-and-answer method (or inquiring method) is widely used to guide students into active participation in the teaching and learning processes. This method encourages students to move beyond memorisation to higher levels of learning that require clarification, expansion, generalisation, and inference (Counter et al., 1996). To use this method, teachers must spend time devising a set of appropriate questions for use during the teaching session. It is a good strategy for the teacher to anticipate student responses to their questions so that they are able to stay ahead of the students.

A well-planned list of questions is the first step towards having a successful question-and-answer session (Counter et al., 1996). Simply posing questions is not enough to motivate or help the students to move to higher levels of learning. Therefore, the teacher needs to structure the follow-up questions ahead of time or probe deeper after a student answers a question. For instance, use the Wh-questions (i.e., who, what, when, why, and where) is useful for checking the information possessed by the students. On the other hand, it is good to remember not to embarrass a student by repeatedly asking questions of a student who is unable to answer. Likewise, the teacher must avoid making negative comments after an incorrect answer in order to prevent low response upon future questioning. Praising and encouraging students who give correct answers in order to motivate them to respond to further questions is recommended.

Application of software—Software tools are widely used today in lectures and are proving to be very effective teaching aids. One of the benefits of software tools is that they provide a clear visualisation of abstract concepts and ideas (Counter et al., 1996). If teachers use relevant software tools, they can improve teaching efficiency in many cases. Specific computer software packages offer students self-learning or e-learning (electronic-learning) systems that can be instrumental in motivating them to learn complicated concepts.
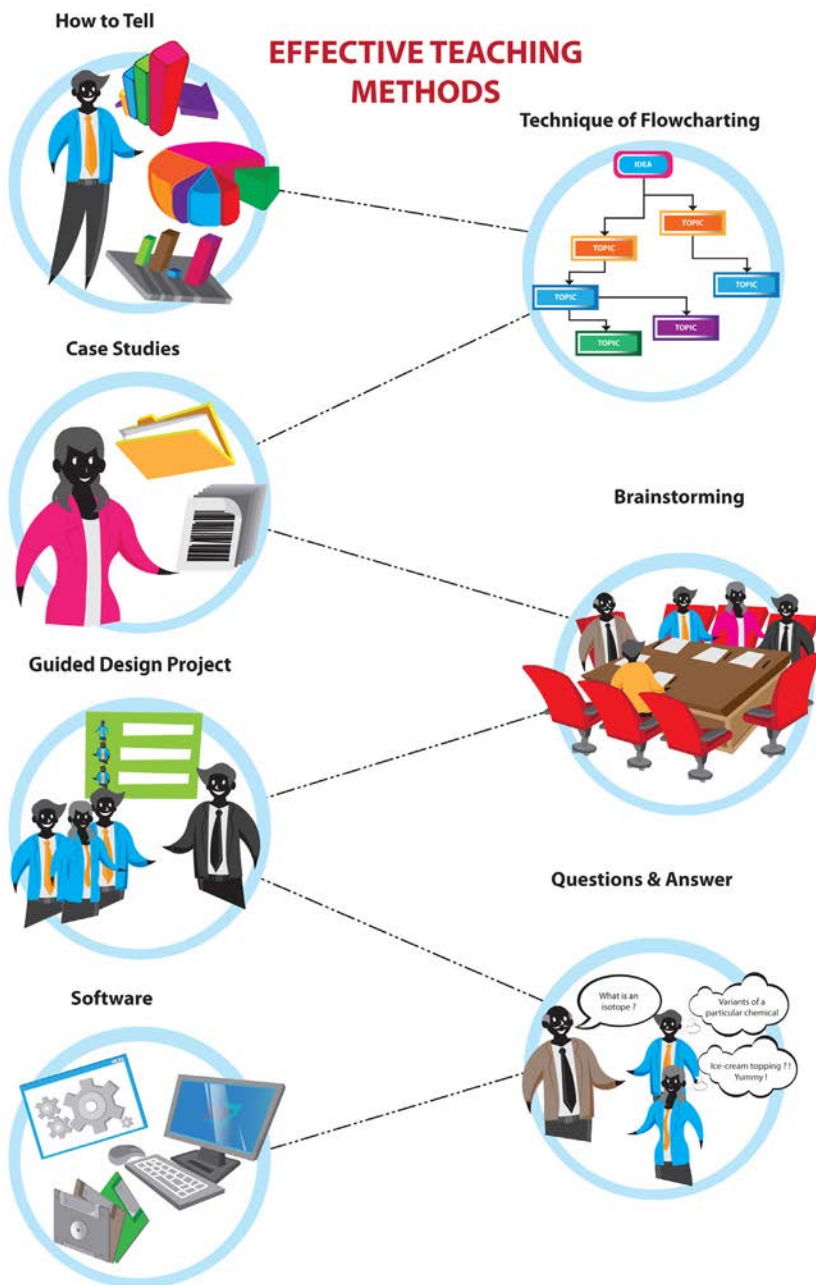
Overview of effective teaching

Learning and positive learning outcomes cannot exist without effective teaching methods. Clearly, learning cannot be separated from teaching, as both processes require the commitment of both teachers and students. In short, faculty members need to develop their knowledge and skills in teaching in order to produce the creative thinkers needed for the future.

Picture courtesy of Centre for Instructional Technology & Multimedia

Effective Learning

Learning can be viewed as the process of acquiring new knowledge, skills, insights, and attitudes (Smith & Blake, 2005). Students enrolled in higher education programs are confronted with a multitude of information from the many courses that they are required to take, and they must absorb and learn this information in a short period of time. The university years often are quite stressful, as students must cope with many demands and expectations. Thus, students have much to gain from having effective learning techniques within their study regimen.

Kizlik (2010) described effective learning as one of the skills that must be practiced by learners. Effective learning occurs when 'learners are motivated and become eager participants in their learning' (Perth & Kinross Council, 2009). To ensure effective teaching and motivation towards teaching, students themselves must possess motivation and enthusiasm towards learning. It is up to the student to discover the methods of learning that are most effective for him or her.

Criteria for effective learning

Discover your learning style—There is no one method of learning. Some people learn best visually (i.e., seeing lecture notes and graphics in front of them) or through auditory means (i.e., hearing the teacher present the material during lectures). Still others learn through tactile methods, through physical touch (working with the hands), or by writing out lecture notes by hand. Many students use a combination of learning methods to learn the course material. Students must also discover their own study quirks: Do they study and concentrate best in the morning or in the evening? In a library setting with others around or isolated without any disturbances? Can they only focus with music on or with complete silence? With discussion among a peer study group or studying on their own? By developing and understanding an individual learning style, the student can become an effective learner.

Organisation and compartmentalising tasks—Students are often overwhelmed by the sheer amount of content that they are responsible for learning. Being able to take a large amount of material and break it down into smaller, more manageable sections can make learning easier. In order for students to do this, they must possess the necessary organisational skills. Through proper organisation, students can make learning fun and effective.

Practice, make connections, and review—Students must review and practice in order to be good at anything. Repetition and application of knowledge is the key here. 'Students cannot learn to think critically, analyse information…work as part of a team, and acquire other desirable skills unless they "do those things over and over in many contexts" (American Association for the Advancement of Science, 1990). Through practice, students can develop ways to make connections and draw similarities between particular concepts that they need to learn. Once connections are made and frequent practice of the content occurs, and with continuous review, there will be solidification of knowledge.

Get feedback from teachers and peers—Students must make an effort to seek feedback from teachers and peers in regards to what they have learned so far in their courses. Faculty members are the best source of information in terms of determining the student's progress and achievement. Students can also utilise friends and peers who are learning the same content to gain a better sense of the things that need to be learned from a differing perspective. Students should focus on receiving assistance that is analytical and suggestive while also making a sincere effort to be interested in receiving feedback from others (American Association for the Advancement of Science, 1990). Once feedback is received, students can work to make necessary adjustments and to solidify their knowledge of the content.

Accumulate life experiences and knowledge—Students need to accumulate life experiences, which may include work-related activities, tasks/responsibilities, and previous education and lessons learned (Lieb, 1991). They need to connect these life experiences to their learning. Students can draw on their own experience and knowledge that is relevant to the topic being taught. They also can relate theories and concepts to their life experience to make learning meaningful.

Be goal oriented—Upon enrolling in a course, students must know the course goals or objectives so that they learn and obtain the knowledge they want and need. Therefore, students need to understand the role of the teacher in helping them attain their goals. Clarification of goals and course objectives must be conducted early in the course so that the students understand and strive towards those goals.

Be relevancy oriented—Normally, one must see a reason for learning something. For students, learning has to be applicable to their work or other responsibilities so that it is of value and benefit to them. This means that students need to choose projects that reflect their own interests so that theories and concepts are relevant and related to a setting familiar to them (Lieb, 1991).

METHODS THAT HELP STUDENTS LEARN EFFECTIVELY

No two people study in the same way or follow the same method, and what works for one person may not function equally for another. However, there are some general methods that seem to produce good results. For students, being successful in their studies depends on their ability to learn effectively and efficiently.
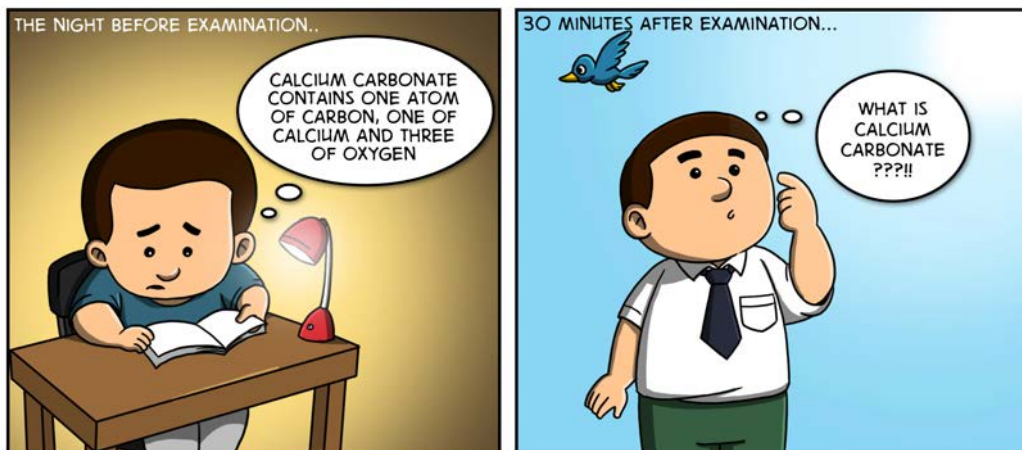
Learn instead of memorise—Before memorising facts and rules, students need to have an overall picture of the learned knowledge. The picture, however, does not have to be complete to the last detail (Wozniak, 1999). It is also important not to memorise loosely related facts. Students need to know the overall content to put the facts together, starting from the basics. Basics are usually easy to retain and take a little time to learn and memorise. After the basics are mastered, students can proceed with learning using individual questions and answers to obtain a deeper understanding of the material.

Keep things simple—Students must formulate their study materials in the simplest way possible. Simplicity does not have to imply losing information or skipping the difficult parts. However, simple content is easy to remember and is easily processed by the brain (Wozniak, 1999). Repetition of simple items is easier for students to schedule, so students need to break complex topics into simpler sub-items. They need to repeat them frequently enough to retain the more difficult items in their memory. If students split complex item into sub-items (chucking), each can be repeated at its own pace, which in the end saves time. Inexperienced students tend to chuck and produce items that could easily be split into simpler sub-items.

Use mnemonic techniques—Mnemonic techniques help with remembering, which explains why 'one picture is worth a thousand words' (Wozniak, 1999). Mnemonic techniques are easy to learn, available to everyone, and do not require any special skills. One of the most popular and respected mnemonic techniques is mind mapping. Mind mapping refers to an abstract picture in which connections between its components reflect the logical connections between individual concepts (Wozniak, 1999). Before the students start believing that mastering such techniques will prevent them from forgetting, they should be warned that the true bottleneck towards long-lasting and useful memories is not in quickly memorising knowledge. Indeed, it lies in retaining memories for months, years, or for a lifetime.

Reduce interference—If knowledge of one item makes it harder to remember another item, students may experience the problem of memory interference. In simple terms, students get confused about what they are learning. Interference is probably the single greatest cause of forgetting during the learning process (Wozniak, 1999). To prevent this kind of interference, students need to combat and reduce the interference so that it will make their learning process less stressful. Students are encouraged

ROTE LEARNING

THE NIGHT BEFORE EXAMINATION..

CALCIUM CARBONATE CONTAINS ONE ATOM OF CARBON, ONE OF CALCIUM AND THREE OF OXYGEN

30 MINUTES AFTER EXAMINATION...

WHAT IS CALCIUM CARBONATE ???!!

to make items as unambiguous as possible and to ask for clarification at all times. For instance, students need to eliminate the interference as soon as they spot it before it confuses them during their learning process. Consequently, they will find it easier to learn without being distracted.

Filter out redundant information—Redundancy means that students obtain more information than is needed or duplicate information from various sources (Wozniak, 1999). Students need to identify the redundancy/duplication of information and to take in only what is relevant. They may find this technique useful and applicable when they are searching for reasoning cues. They can boost their reasoning ability by asking about the solution to the problem (i.e., asking for the specifics). Instead of 'cut and paste' answers, students need to follow quickly the reasoning steps and generate the answer.

Prioritise—Students need to know that prioritising is critical when they are building knowledge. The way in which students prioritise influences the way in which they gain knowledge. Similarly, it also affects the speed of learning and whether they learn effectively or not (Wozniak, 1999). There are many sources of knowledge for students, including books, journals, and notes from different courses. Therefore, students must prioritise these sources and extract only the parts that are significant and that impact the quality of their knowledge. They can accomplish this by marking paragraphs in a book or journal, pasting relevant web pages to a folder, and typing facts and figures directly into their notes. The best way to prioritise the flow of knowledge into their memory is to use incremental reading tools or electronic aids such as computers or notebooks. As they progress in their learning process, they will quickly develop the experience needed to identify information that is relevant and significant.

Summary

The criteria and methods for effective learning that were discussed above are by no means exhaustive and conclusive. Much variance can be found in the literature. However, profound similarities can be found when comparing the criteria for effective teaching and those for effective learning, which

underscores the intense symbiotic relationship between teachers and students. Both must possess and profess interest and enthusiasm in teaching what needs to be taught and learning what needs to be learned. Both faculty members and students need to be well organised and open to receiving feedback in terms of his or her individual progress. Thus, feedback, through the use of assessments, will be the focus of the next section.

ASSESSMENT OF EFFECTIVE TEACHING AND LEARNING

In higher education, assessment refers to any process that appraises an individual's knowledge, understanding, abilities, or skills (Quality Assurance Agency for Higher Education, 2006). Assessment and grading practices are used to measure and report learning outcomes. Harvey (2004) stated that assessment of teaching and learning is a process of evaluating the quality and appropriateness of the learning process, including the teacher's performance and pedagogic approach. This includes assessment of how well the faculty member performs as a teacher and learning facilitator and the appropriateness of the pedagogic processes and practices used, including the suitability of the methods used to assess students' progress and development.

A good assessment of effective teaching and learning must be fair and clear. It must have a specific goal to show what a student has or has not learned. Moreover, different assessment tools should be implemented for different purposes. There are many different forms of assessment that serve a variety of purposes. These include promoting students' learning by providing them with feedback, normally to help them improve their performance. Assessments also can be used to evaluate the students' knowledge, understanding, abilities, and skills that they have gained from the learning process (Assessment Online, 2010). Assessment of effective teaching and learning provides a grade that shows students' performance so that they can make decisions about their future. Assessments also can be used by employers and higher education providers to determine if an individual has attained the appropriate level of achievement. This also reflects the academic standards set by the educational institution.

The way in which students are assessed often has a significant influence on their learning. To pass the course or program, students have to demonstrate that they have achieved the intended learning outcomes. Below are some criteria of assessment that can be used to promote effective teaching and learning.

Knowledge of curriculum content

Knowledge of curriculum content is essential for assessment of effective teaching and learning (Assessment Online, 2010). Faculty members must have a deep knowledge of the material they are teaching and how students learn it. Quality assessment depends on knowledgeable teachers who are able to observe and respond to the interpretations of their students so that they can enhance their students' learning process. The ways in which teaching, learning, and assessment are structured by the

faculty are a direct product of teachers' content knowledge and beliefs about how their students think and learn.

Historically, accounting of student learning has been guided by a taxonomy of learning called Bloom's Taxonomy (Bloom & Krathwohl, 1956). This taxonomy consists of a hierarchical structure that possesses six levels of thinking and learning skills that range from basic learning objectives (e.g., knowledge of content) through higher-order learning (e.g., synthesis, evaluation, and creativity). Bloom's Taxonomy was the basis for early work on the development of instructional objectives for knowledge content (Center for University Teaching, Learning, and Assessment [CUTLA] 2011).

Bloom's Taxonomy (Revised)

- Create
- Evaluate
- Analyze
- Apply
- Understand-Describe, Explain
- Knowledge-Remember
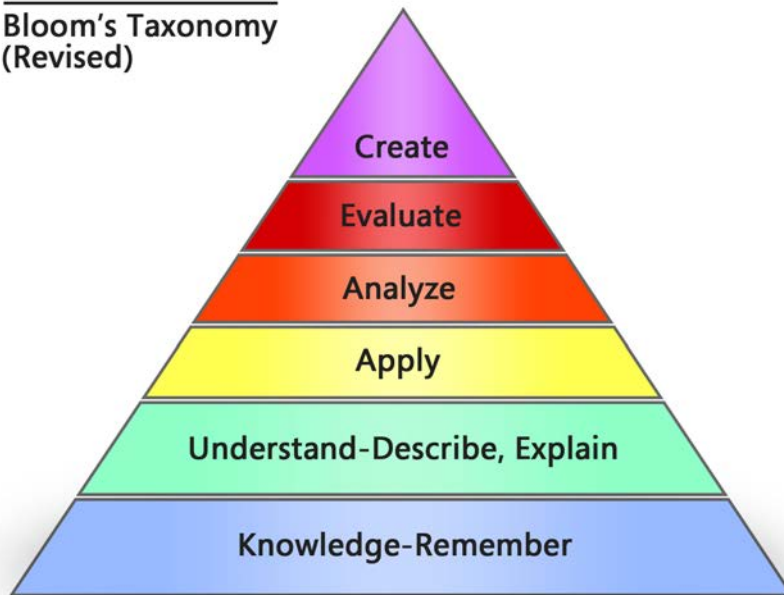
Based on an APA adaptation of Anderson, L.W. & Krathwohl, D.R. (Eds.) (2001)

Developing higher-order thinking levels in students is not an easy task. Thus, teachers should refer to Bloom's Taxonomy for assistance as they prepare assessments for their classes. For instance, design and review of the curriculum should promote students' development along Bloom's Taxonomy from basic (i.e., remember, describe, and explain) to intermediate (application and analysis) to advanced (evaluation and creation) levels. In a well-designed curriculum, students develop their basic learning skills and acquire foundation knowledge in the earliest courses (CUTLA, 2011). As they move to more advanced courses, they develop higher-order learning methods and a more advanced understanding of their specific field.

Skills content

In the Malaysian context, the Malaysian Qualification Framework stresses the following eight domains of learning outcomes: knowledge; practical skills; social skills and responsibilities; values, attitudes, and professionalism; communication, leadership, and team skills; problems skills and scientific skills; information management and lifelong learning skills; and managerial and entrepreneurial skills (University Education in Malaysia, 2009). It is important that the assessments used evaluate all of these skills.

Learning environment

Learning environment refers to the use of methods, management, teaching aids, and instruments/ equipment that are designed and used by faculty members to affect teaching and the quality of student learning (Senate Committee on Teaching and Learning [SCOTL], 2002). Feedback from students should always be used to help teachers improve their methods, management, teaching aids, and equipment so that they are helpful in directing learners. Some ways of assessing the learning environment include short summaries, critical incident questionnaires, and focus groups.

Well-planned assessments

Assessments of students should be well planned to assess learning outcome, teaching strategies, and environmental factors. A good assessment should be flexible so that changes can be made in response to new information, opportunities, or insights (Atherton, 2010). Moreover, assessment strategies should review students' understanding of the goals they are pursuing.

Valid and fair

Assessments should be valid, fair, and suited to the purpose (Atherton, 2010). They should measure progress, not just achievement. To make a valid and fair measure of progress over time, teachers need to analyse information from various sources (i.e., not just from an examination). It is important that they gather information both formally and informally via student self-reflection and peer evaluation.

Methods used to assess effective teaching

A range of assessment approaches should be used to promote effective teaching and learning. These methods are categorised into two groups: methods for assessing teachers (i.e., effective teaching) and methods for evaluating students (i.e., effective learning).

Teaching portfolios—A teaching portfolio is a factual description of the instructor's teaching achievements and contains documentation that collectively suggests the scope and quality of their

teaching (SCOTL, 2002). A teaching portfolio can be used to present evidence about teaching quality for assessment purposes, as it provides a useful context for analysing the teaching. Alternatively, a teaching portfolio can provide the framework for a systematic reflective analysis and peer collaboration leading to improvement of teaching.

Teaching portfolios provide an opportunity for faculty members to articulate their teaching philosophy, review their teaching goals and objectives, and assess the effectiveness of their lectures and the strategies they use to identify areas of strength and opportunities for improvement. They also can highlight their range of responsibilities, accomplishments, and contributions to teaching and learning more generally within the department, university, and scholarly community (SCOTL, 2002).

Continuous improvement plan—By definition, a continuous improvement plan is a set of activities that are designed to bring gradual but continual improvement to a process through constant review (Reh, 2010). A continuous quality improvement process measures learning outcomes of the courses taught. Implementation of this process will provide teachers with a continuous assessment to check course contents, teaching methods, and skills that can enhance students' performance.

Assessment and improvement processes require the commitment of the faculty. These tasks include preparing lecture materials that facilitate students' understanding of course contents and developing course tasks that stimulate students' critical thinking, problem solving, communication, and teamwork cooperation. Teachers also need to introduce adequate action plans that can improve learning outcomes of students who are slower at comprehending the material. With the plans in place, teachers can develop teaching strategies and adopt new tools and technologies that are beneficial to all students taking the course.

Students' assessment capability—When students actively participate in assessing their learning by interpreting their own performance, they are able to recognise important moments of personal learning (Assessment Online, 2010). This helps them to identify their own strengths and needs and discover how to make further decisions in the future. Faculty members need to change the students' mindset about assessment by teaching them assessment capabilities; in this way students will understand that the assessment is for them to take charge of their own learning. Through this process, students will become more effective and independent learners. Moreover, assessment-capable students can provide better information to teachers. Better student feedback gives a clearer picture of students' learning needs and enables more self-development of learning.

Methods used to assess effective learning by students

Student ratings of teaching—Student ratings of teaching (i.e., student evaluations) are the most commonly used source of information about teaching. For purposes such as tenure and promotion, data are obtained over time and across courses using a set number of global or summary type questions (SCOTL, 2002). Such data provide a cumulative record and enable patterns of teaching progression to be detected. Information obtained from student ratings is commonly used by teachers to improve their courses and to identify areas of strength and weakness in their teaching. Longer and more focused questionnaires are normally used as a formative evaluation.

The use of a standardised questionnaire in an institution puts all teaching assessments on a common footing and facilitates comparisons among courses, academic staff members, and departments. The data gathered often are used to assess whether the educational goals of the department are being met (SCOTL, 2002). Structured questionnaires are particularly appropriate when relatively large numbers of students are involved. Such surveys are relatively economical to administer, summarise, and interpret. Students are only asked to comment on items with which they have direct experience through their learning process. Student responses to the questionnaires have been found to be valid. Open-ended questions in the questionnaire provide insight into the numerical ratings and provide pertinent information for course review and revision.

Course portfolios—A course portfolio is a variant of the teaching portfolio and is the product of focused inquiry into the learning by students in a particular course (SCOTL, 2002). It represents the specific aims and works of the teacher. It generally includes components such as aims and strategies of the course; the relationship between the method and outcomes; analysis of student learning based on key assignments and learning activities to advance course goals; analysis of student feedback; a summary of the strengths of the course in terms of students' learning; and critical reflection about how the course goals are realised, changed, or unmet. The final analysis leads to ideas about what to change in order to enhance student learning, thinking, and development of the course the next time it is taught.

Examinations — A test or an examination is an assessment intended to measure students' knowledge, skill, aptitude, physical fitness, or classification in all of the topics taught over the semester. It usually is divided into two or more sections, each covering different domains of learning or taking a different approach to assessing the same aspects. Examinations are used mainly to assess a student's understanding through application of the course. Grades or results from the standardised examination are used to determine if a student achieves the standards set.

In conclusion, a good assessment should focus on making students' thinking visible to both the teacher and the student. It should help students become more aware not only of the course content but also of the process of learning. This gives them a control of their own learning via development of the skill of self-regulation.

CONCLUSION

The future of any country depends on its human resources, and the productivity and efficiency of the human resources are outcomes of effective teaching and learning. The soul of learning is teaching. Therefore, faculty members need to be effective teachers. This chapter included a broad discussion of the definition, criteria, and methods on effective teaching and learning. It also covered criteria and methods of assessing effective teaching and learning.

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Part

Individual Teaching Practices

2

> "Teaching has always been one of the greatest and most satisfying experiences in my life. Through the wonders of teaching we can reveal the hidden beauty to our students. Knowledge does not narrow, knowledge only adds... and without knowledge many experiences in life remain very narrow and very shallow."
>
> Professor Walter Lewin, MIT

PERSONAL TEACHING PHILOSOPHY

I simply love teaching! Teaching, above all else, brings me great joy. I think I have a natural interest (if not talent) and passion for teaching, and I'm very grateful to Allah for giving me this honorable career. My earliest teaching experience was when I was in secondary school and my friends would ask me to help them with science and when I taught my neighbour's children

to read Quran. In Forms four and five, I taught my friends chemistry, and in school I was known as the 'chemistry wizard'.

In retrospect, I have always found myself in an academic environment. When I graduated in 1986 during the economic slump, I worked for a few months selling encyclopedias. Then I taught in a private school while waiting for a permanent job. That experience was very exciting and rewarding and led me to choose teaching as a lifetime career. That was the best decision I ever made. I genuinely enjoy teaching and cannot imagine myself doing anything else. I still teach every class with passion, excitement, and enthusiasm, as if I am teaching it for the first time.

As I reflect upon my academic career, it is clear that my teaching style has been strongly influenced by my mentors. What made my mentors exemplary teachers was their devotion to their students and to their profession. Specifically, my mentors set high academic standards for students and for themselves.

Central to my philosophy of teaching is to create a stimulating and non-intimidating environment in the classroom. I believe that teaching is an exciting adventure in which both the teacher and the students participate and cooperate to achieve a common goal. It is much like 'Explorace' (TV programme), in which team members have to work hard together to accomplish certain tasks, overcome challenges and obstacles, and finally reach their destination and celebrate the success together. Learning means questioning, reflecting, and reviewing. I work hard to stimulate my students' intellectual curiosity and interest and get them genuinely involved in the process of learning. I urge students to actively participate in the class in several ways. For example, at the beginning of each lecture, I ask a few students to give a summary of the previous lecture. This strategy serves to reinforce their understanding and also enables me to gauge and correct any misconceptions.

I believe in facilitative learning, where I assume the role of facilitator. I always make it very clear to my students that my role is mainly as a guide. When I teach a new batch of students, I start the first lecture by showing a slide with this quotation from George Bernard Shaw: 'I'm not a teacher, only a fellow traveler of whom you asked the way'. A teacher can only point; learning is done entirely by the student. I like to think that I lead my students on an intellectual journey through their course of study. My role is to point out the scenic attractions, highlighting particular features of the subject matter and focusing attention on major points, important terms or concepts, relevant issues, and significant relationships.

I believe our role as educators goes beyond transmitting knowledge: Our role is to nurture our students to become lifelong learners, to teach them to 'learn how to learn', and to teach them to appreciate and love knowledge. This is the essence of what enables our students to become successful lifelong learners. I always emphasise to my students that what they will learn during their time at the university is merely the tip of the iceberg. There is a vast amount of untapped knowledge that they need to explore, just like the base of the iceberg that is unseen because it lies below the surface. I want them to understand that they need to develop the skill of 'learning how to learn' because once they acquire this skill they will be able to explore the knowledge universe. In other words, I want them to acquire the so-called '21st century skills',

which include learning and innovation skills (critical thinking, problem solving, creativity, innovation, communication, and collaboration), Information and communications technology (ICT) literacy, and life and career skills (flexibility, adaptability, self-direction, and social awareness).

THE ATTRIBUTES OF A GREAT TEACHER

I strongly believe that the following five characteristics constitute excellence in teaching: enthusiasm, clarity, preparation/organisation, stimulating, and love of knowledge.

Enthusiasm

Without a doubt, enthusiasm is critical to promoting a vibrant classroom. Passion and love for the subject are essential and can do wonders in terms of providing a tangible benefit for the students. If students see a teacher who passionate about and exudes enthusiasm for the subject he/she is teaching, inevitably they will be affected positively by this energy and will engage themselves actively in the learning process. The enthusiasm that teachers bring to the classroom helps to create an encouraging and supportive atmosphere.

I firmly believe that teachers who share their passion for teaching and who teach with enthusiasm and empathy are more likely to both connect with learners and increase learner performance. Numerous studies have shown that students respond favorably to enthusiastic teachers, and this trait has always been associated with teaching excellence. In my classroom, I always want to be seen energetic and enthusiastic when delivering a lecture. Although it is difficult to maintain the same level of enthusiasm day after day, teachers have little choice if they expect students to reciprocate and if they want to make the classroom come alive.

Clarity

A good teacher clearly explains his/herself clearly so that students understand exactly what is being taught. Teachers should have an excellent grasp and mastery of the subject they teach, and they should be able to articulate their ideas succinctly without any ambiguity. Even though teachers are the subject matter experts, sometimes they need to try a few different ways of explaining a topic before they find the one that is most effective for their students. In my view, when a teacher is able to explain something in more than one way, it shows that they have a complete understanding of the information they are teaching. This ability validates what they say to the students and makes them believe in their teacher's mastery of the subject.

In my classroom, I spend a lot of time introducing and explaining important concepts. The approach to presenting material in the classroom is of utmost important to achieve this objective. Typically, before delivering a new concept to students, I provide background information and ask them to find the solution to certain questions. This approach reveals the depth of their prior knowledge and their grasp of fundamental principles. I next introduce the theory I want to communicate. This approach creates curiosity so that the students want to learn about the concept. It enables the students to

remember the subject forever and also stimulates them to look for other approaches to master the task of remembering.

Preparation and organisation

A good teacher puts considerable effort, energy, time, and even money into organising and preparing teaching materials. Typically, this includes constructing detailed course outlines, establishing course objectives, and defining evaluation procedures.

Stimulating

Boredom can be a teacher's greatest enemy. Thus, it is important that teachers create a stimulating environment that captures the interest of the students. Stimulating teachers are entertaining, motivating, captivating, engaging, interesting, enlightening, and thought provoking. Making learning fun and stimulating is easier said than done—it is an art as much as it is a practice. To be stimulating, teachers must be creative and use any tools or techniques at their disposal. Teachers should be aware of the available pedagogical options and techniques so that they can 'mix and match' as appropriate to suit certain learning environments and different learning styles.

I view teaching techniques and tools as a buffet lunch, with a variety of foods from which to choose. With many teaching repertoires available, teachers should not be predictable in their teaching practices. In my view, all great teachers are unpredictable because they always surprise their students with different 'tricks' up their sleeves.

Knowledge

Teachers are considered to be subject matter experts and are expected to have a mastery of the subject they are teaching. Sherman et al. (1987) divided knowledge into two general categories: the teacher's grasp of the subject matter and the teacher's love of and passion for the subject matter. I see this as the 'disciplined mind' described by Howard Gardner in his book, *Five Minds for the Future* (Gardner, 2006). Gardner proposed that one needs to know how to do at least one thing really well. In other words, a disciplined mind refers to the ability to focus and develop a deep knowledge and mastery of any subject matter, be it music, photography, or quantum physics. This means that if I teach about food chemistry, I should have in-depth knowledge of the subject so that I can appropriately guide my students in their exploration of the subject.

TEACHING APPROACHES

The five attributes of great teachers described above are by no means definitive. To be an excellent teacher, one has to systematically and reflectively appraise one's own teaching approaches and strategies. Knowing what makes great teachers is not enough; it is more important to practice and infuse the best practices of great teachers consistently into our teaching, always with the goal of achieving teaching excellence.

Enthusiasm

Preparation and Organization

Attributes of a great teacher

smile

Knowledge

Stimulating

VS

Clarity

When I teach, I use a number of approaches. Below I highlight some of the things that I believe are essential to effective teaching.

Structured lectures

My primary objective when teaching any food science/technology subject is to make the students understand and appreciate the significance of that course in the real-world food industry. My second objective is to provide them with the fundamental knowledge required for that course. I structure my lectures so that I can achieve both objectives. I try to begin each class with a brief summary of the previous class session and a reminder of where we left off. At this point I usually ask if there are any questions from the reading, homework, or previous class. After this brief discussion, I usually give a lecture on new material. I try to begin the lecture with a brief outline and a list of objectives, and I always try to include examples during the lecture. I always encourage questions and pause during the lecture to answer them. Depending on the time and topic, I may then have an in-class exercise before finally recapping the lecture.

Ensure that the students understand the concepts/principles

My priority is to ensure proper and clear understanding of the concepts, principles and the underlying mechanisms of a process or phenomenon. This is in line with a quote from the great physicist Albert Einstein:

'I do not burden my memory with simple facts that can be looked at in text books, but the true purpose of education is to train the mind to think, for that purpose it is priceless'.

Albert Einstein
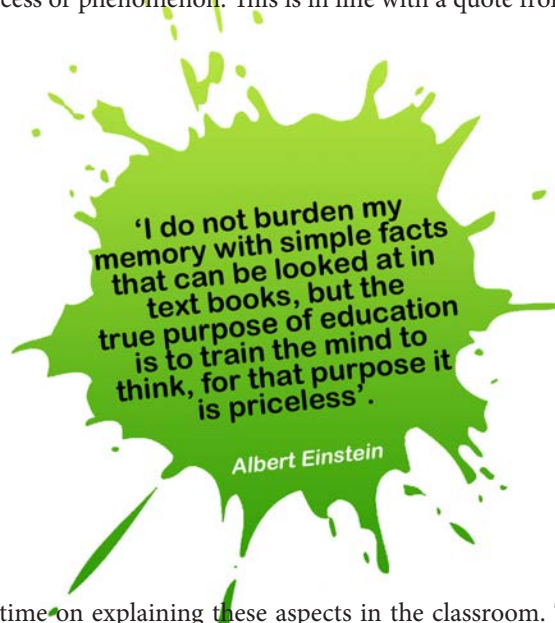
Thus, I spend more time on explaining these aspects in the classroom. Typically, before delivering a new concept to students, I articulate the background information, and ask them to find out the solution. Then I introduce the theory I wanted to communicate. This approach creates curiosity to learn about the concept. The approach in presenting the material in the class is of utmost important to achieve this objective. It enables the students to remember the subject forever and also stimulate them to look for other approaches for that task.

Provide practical examples

I try to use a lot of practical examples to increase the students' interest level and to help them see what they learn in the context of real applications (e.g., in the food industry). For example, in my classes you might learn why tomato sauce flows more readily than plum sauce, why the chocolate bar melts in your mouth, and why the soft margarine is spreadable but the block margarine is hard. This approach is effective for at least two reasons. First, it lets the students see the relevance of the information. Second, it helps them own the knowledge; they can see with their own ears and eyes what the concepts mean for them.

Hands-on approach

In a laboratory class, I personally show students how to conduct the experiment (e.g., how to carry out the titration, set up the apparatus, etc.).

Learning by doing

I HEAR, I FORGET...I SEE, I REMEMBER...I DO, I UNDERSTAND...
(Old Chinese proverb)

Many educators say that the best way to learn is by doing. During my 18 years of teaching at the university, I have found this to be very true. I always tell my students, 'You can read all you like, but until you make mistakes left and right, you have no idea how things actually get done!' In many of the course evaluations written by students, this 'hands-on' approach has been highlighted as the most effective part of their learning experience.

Seeing is believing

To convey the excitement of food science to my students, I often perform live demonstrations in the classroom to introduce or illustrate a concept, and usually I ask one or two students to help me. In one lecture, for example, I bring one full bag containing ten different types of food products. In another course, I bring and assemble a piece of equipment in front of the class. Over the course of a semester, these demonstrations include pouring tomato sauce onto a plate and pouring milk into a glass to demonstrate the concept of viscosity and playing with silly putty to illustrate viscoelastic properties. When live demonstration is not possible, I show a video. I always use pictures and graphs to illustrate different concepts, as most students can then at least intuitively understand the concepts even if they have trouble understanding the analysis.

DEMO GONE WRONG
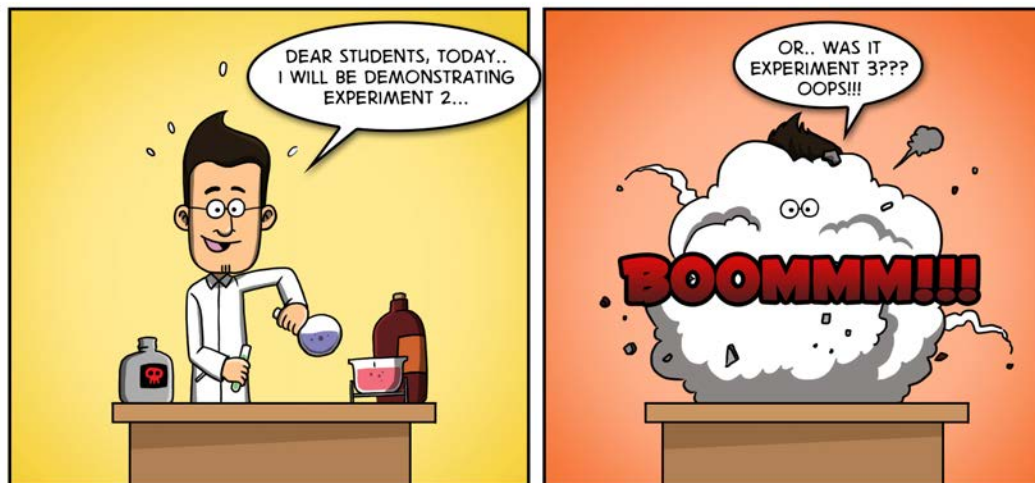
Advanced preparations

Confidence comes with a prepared mind and mastery of the subject. I always prepare my lecture well in advance and update the material when necessary. I like to visualise the sequence of how I conduct the learning activities during the 50 minutes lecture. Most of my classes start at 8:00 a.m., and I always eat breakfast before I come to class. This is because I always want to be seen energetic and enthusiastic when delivering my lecture. Usually I arrive in the lecture room at least 15 minutes early to set up my computer and get everything ready. I regularly score 98–100% on 'preparedness of teacher to deliver lecture' on students' evaluation forms. I conduct my lectures according to the schedule that I prepare at the beginning of each semester.

Meticulously prepared teaching materials

I prepare the lecture handouts/modules meticulously and cover the important topics presented in the lecture. I do not simply give students a photocopy of a chapter from the book. I also prepare PowerPoint slides meticulously for classroom presentation, and I use vivid colours, pictures, videos, and animation. I set up acting and taking a video or photograph to demonstrate certain concepts. I do all the editing myself. I do not simply scan diagrams or tables from a book; instead I take great pains to redraw diagrams or redo the tables. Teaching materials prepared haphazardly reflect the image of the teacher and send a wrong message to the students.

Learning beyond the classroom

I believe that students should experience the world beyond the classroom as an essential part of learning and personal development. This makes learning more engaging and relevant and allows students to appreciate the wider perspective and nurture their creativity. I have found that taking

students out into the real world immensely enhances their understanding of the course. For example, I arrange for a factory visit for the students or have them conduct a final year research project in the factory so that they can attain useful practical knowledge.

Bring the laboratory and factory to the classroom

Sometimes it is not possible to arrange for a factory visit, either because of the large number of students or the factory's rules (some factories only allow visitors in the laboratory, not in the production area). Furthermore, some of the courses I teach have no laboratory component, but sometimes it is necessary to show the students certain techniques required to carry out an experiment. Therefore, I often set up experiments in the laboratory, take pictures or videos of the experiment, and show them in the lecture. I also go to the factory to take pictures and videos (with prior permission), which I edit, narrate, and present in my lecture, all at my own cost.

Continuous communication

I believe that one of the secrets of good teaching is to continuously engage the mind of the student. Therefore, I communicate with my students almost on daily basis (using the e-learning portal and social media platforms such as Edmodo). I try to answer questions as soon as they are posted in the forum (i.e., provide immediate feedback). The visibility and responsiveness of the teacher help to promote a continuous communication channel, not only between student and teacher but also among the students.

Regular group discussion

I hold regular group discussions using online collaborative platforms such as Edmodo or Collaborise Classroom.

Utilise current instructional technologies

I take advantage of many of the available instructional technologies, including the following:

Technology-enhanced learning—I use computer-mediated instruction and the Internet to provide online learning. This overcomes the time constraint associated with conventional face-to-face lectures, thereby adding value to the course and enriching the learning experience of the students.

Mind mapping technique—I also encourage students to use the mind mapping technique. At the end of each major topic, I ask the students to summarise what they have learned and understood in the form of simple mind map. In the next lecture, I show my own mind map and ask the students to compare and improve their mind map.

Creating an atmosphere conducive to learning

I fully believe in Albert Einstein's sentiment that

'It is the supreme art of the teacher to awaken joy in creative expression and knowledge'

Albert Einstein

To this end, I try to be entertaining to keep the students' interest. I foster an informal atmosphere and demand that students ask questions. People learn well when they are relaxed and engaged with the issues.

Learn while having fun

Through my e-learning portal and social media platform (Edmodo), I add elements of fun in the form of interactive crossword puzzles, word games (akin to 'Wheel of Fortune'), interactive quizzes, matching correct pairs, and grouping items into correct categories. These games add another dimension to my teaching while offering the students a multitude of learning approaches. My students really enjoy the games.

GUIDING PRINCIPLES

Regarding my teaching approach/strategy, I follow these guiding principles:

Clear understanding of basic principles

I believe that learning requires a deep understanding that can only be achieved when students understand the concepts and principles and actively apply knowledge in creative and meaningful ways. Therefore, the goal of my lectures is generally to acquaint students with the fundamental and applied aspects of physicochemical properties of food systems. I try to convey the importance of a thorough understanding of basic concepts and principles rather than simply asking students to memorize facts, equations, and numbers. Whenever possible, I try to present the intuitive non-mathematical description that accompanies the mathematical one. My goal is to reinforce this association so that it will be useful when the student re-encounters the problem later in his/her career.

I also believe that physical concepts cannot be taught or learned merely through lectures and/or reading. These concepts demand the use of an entirely different part of the brain. For this reason, I use problem sets extensively in all of my teaching. Because I consider the problem-solving process to be so important, most of my examination questions are based on problem assignments (also known as the problem-based approach). I find that frequent assignment of problems ensures that students have thoroughly studied the concepts that were presented in my lectures. I often present problem sets in my lectures and then lead the students through the analysis in a step-by-step fashion. Many times the problem sets present new material that has never been covered in class. This can be a very time-consuming way for the students to learn, but I have been pleased to hear from many students that they consider it time well spent. I also encourage the students to collaborate on the problems and encourage them to have discussions with me. This not only helps the students overcome some of the thorny concepts but also provides useful feedback to me to improve my lecture presentations and problem writing.

In my opinion, students should understand the relevance of the course to their lives. For example, when I taught the Physical Properties of Foods course, I began by giving a few scenarios to illustrate the importance of studying and understanding physical properties. For each course, I identify the concepts and procedures that I want each student to master. I try to help the students tap into their prior knowledge or experience, test it against what is presented in class, and use that knowledge as a basis on which to build a greater understanding of a more complex concept or theory. I then develop a sequence of instructional activities intended to lead to that mastery. Students are expected to demonstrate conceptual mastery, not just to recognise or recall facts. Using this approach, I hope that students will be able to translate and relate the course material to their own lives and to apply abstract

HIGHLIGHT

To illustrate my approach to ensure proper understanding of basic principles, here I describe how I conduct my practical class (IMG 203 - Makmal Analisis Makanan) that involves chemical and instrumental analysis of food composition. For this class, it is essential that the students learn and master the right techniques to carry out the chemical analysis or operate the instrument and that they understand the theoretical aspects of the experiment. Students are divided into groups (4–5 students/ group), and each group is assigned different experiments. Before the class starts, I give a briefing. After the briefing, I tell the students to start preparing the apparatus or sample, but I do not let them to start the experiment until I brief the group. I visit each group in turn and ask them to explain how they will conduct the experiment and the reasons why certain steps are done. Then I brief the group about any precaution they have to observe during the experiment. During the class, I make rounds from group to group to observe their technique; if necessary, I demonstrate certain techniques to make sure they do them correctly. After they have completed the experiment, I meet with each group and discuss the results and any problems they encountered during the practical. At this point, I ask many questions and I also let the students ask questions. This approach, although strenuous, is a very effective way to ensure proper understanding of the subject. This is particularly true for laboratory classes, but it also is applicable to theory classes.

theories or difficult concepts to what they experience in their everyday world. Ideally, this approach should empower students to articulate ideas and process concepts in ways that are meaningful to them.

Teacher/Lecturer as a facilitator (i.e., facilitative learning)

Facilitative learning requires that students do the work. However, it is not easy to adapt to this new way of teaching (i.e., managing more open-ended discovery by students). Following this approach means shifting our role from a lecturer to a facilitator who provides resources, monitors progress, and encourages students to problem solve. For example, I asked a group of six students to come up with a demonstration of physical properties of food with respect to their impact on food quality, food processing, food safety, and consumer acceptability. This assignment required them to put together the concepts they had learned in class and translate them into a visual demonstration. Many students, especially those who prefer to just memorize facts, are uncomfortable with this kind of open-ended assignment. They are not familiar with projects that require them to apply their knowledge to solve

a problem. Thus, students can get frustrated, and this is where my role as a facilitator is important. If I am effective in this role, students will become more creative and will be able to apply their learning to life's challenges.

Promoting active learning

In my lectures, I always include questions that are designed to allow students to reflect on the important points I highlighted during the class session, share their reflections with surrounding classmates, and briefly discuss the insights gained from the activity as a group before continuing with the lecture.

I also encourage students to participate in the forum within the e-learning portal that I developed. I design questions that require deep thinking, analysis, and application of the concepts/principles that were presented in previous lectures. I post the questions on the forum and let the students respond. I always respond to each student, as this motivates and encourages him/her to actively participate again. In so doing, the students not only interact more with me and one another, but they also become active participants in a community that is larger than the classroom itself.

Learn while having fun

If learning is about problem solving and mastering skills, what greater way is there to accomplish this than by using games and simulations to help us teach and learn? By 'doing' and by collaborating, people learn more and retain that knowledge over longer periods of time. When having fun, students are actively involved in the process of working a problem through to a solution. I experiment with this idea using my e-learning portal as a delivery medium for interactive games such as crossword puzzles, quizzes, matching pairs, groupings, and word games.

My experiences with 'playing to learn' via e-learning have taught me that the use of games and simulations can help bring to life knowledge and information that might otherwise exist only as bullet points on slides. The use of stories as the basis for case studies, scenarios, role playing, and problem solving in a game or simulation-based format provides a memorable, vivid, and fun means for live e-learning sessions, and students learn,

remember, and retain knowledge effectively over time. As evidence for the effectiveness of this technique, here are some comments from the students (verbatim):

> "*The word game was fun and mind boggling. Very interesting! With the clock ticking, my heart couldn't stop a beat and there was no time to refer to notes in order to answer the questions as fast as possible before time out. I wouldn't consider this game as childish because at times I'm a kid at heart too. Ha ha.. We can't be all that serious at all times, can we?*"
>
> "*Wow... it's a very exciting game…made me stress my brain… but at least I learned something..*"
>
> "*For the word game, I would say it's really an interesting game. Even though I had searched the lecture notes several times, I was still not able to solve the puzzle. It really made me think repeatedly what suitable letter should be put into the box*".

Use stories and anecdotes

> *Do you know how MSG (monosodium glutamate, a common flavor enhancer added to food) was discovered? Did you know we can produce sugar from starch – any starch? Do you know the history of food canning? Do you know that everything flows, even the mountain – if we wait long enough? Do you know…OK, let me tell you an interesting story…here it goes...*

I like stories, and I think students of all ages also love stories. One of the classroom techniques that I personally have found most rewarding is the telling of anecdotes and stories. Science is full of interesting stories and anecdotes that can transform an ordinary lecture/presentation into a memorable one. Whenever possible, I begin my lecture or presentation by asking questions or telling stories and anecdotes. Judging from students' responses and facial expressions, I believe that most of the time (perhaps all of the time) the students enjoy hearing such stories. You don't have to be Tom Cruise or Nicole Kidman to lighten up your class room; all that is needed for the storytelling approach

is a pool of stories and a little narrative ability. I believe that telling a story is an effective way to engage student because it draws them into the learning process. It is a valuable way to make the learning environment exciting, encourage learning, and also a way to put things into perspective.

As an example, consider my course on Starch Chemistry and Technology. Starch is a type of carbohydrate that is present in bread, rice, and cereals. Starch is a very important component of food because it provides the essential energy for the activities of our daily lives. I emphasise to my students that starch is actually a form of stored energy in plants and that this energy can be released and harnessed by our system by breaking down starch into sugar. As an analogy, it is like chemical energy stored in a battery that can be converted into electrical energy. The challenge is how to explain this important fact, and to do so I make it into a lively and interesting story. The bottom line is that with this story, I whet the students' appetite to learn more about the chemistry and technology of starch. To ensure that a story or anecdote will capture and captivate the students' or audience's attention, it is important to rehearse it beforehand, because when you tell the story, you have to deliver it smoothly, coherently, and convincingly.

INNOVATION IN TEACHING

I view teaching as a vital and enriching part of my job. Therefore, I am dedicated to continuing to explore innovative ways to enriching my teaching, both in terms of pedagogy and content. I regularly review my teaching practices and experiment with creative techniques and new ideas. I continue to make changes to my courses every time I teach them, as I believe that we never really get it just right. I describe some of my innovations here.

Development of the e-learning portal

One of my most significant efforts to improve my teaching was the development of the e-learning portal. The portal is based on the Open Access Learning Management System (Moodle). This portal provides a platform for the development of e-learning or online courses to supplement the conventional face-to-face lecture. Simply put, e-learning is designed to add value and to enrich the learning experience of the students. I truly believe that this medium (portal) can play a significant role in helping students get the most out of the course. Indeed, I consider the development of the portal to be a significant milestone in my teaching career: It as an achievement of which I am very proud. Features of my e-learning portal include the following:

Summary of each lecture—The design of my e-learning course is perhaps rather unconventional in the sense that the course content is evolving as the classroom lectures progress during the semester. The e-learning course is divided into 14 weeks. After each lecture, I provide a summary of the lecture in the portal, usually within 24 hours. In most cases, I add additional points, analogies, illustrations, and examples. When writing for the portal, I prefer to use informal language (i.e., a conversational style). From the feedback I have received, I find that the students like this approach because they feel as if I am talking to them directly. I also often discuss the important points/ concepts of the lecture in the portal from a different perspective; therefore, I do not merely repeat

the same things I presented in the classroom. In this way, the students can view the concept presented in the lecture from different angles.

Learning activities—Learning activities can help transform online courses into exciting, meaningful, and active e-learning experiences. Much like the activities and games used in traditional classroom training, these e-learning activities can be used to increase interactivity, engage learners, accomplish learning objectives, develop online relationships, promote active learning, and create learning communities. Some examples of learning activities are:

Forum—There are two types of forum: general and specific. The general forum is the place where students can post a message, comment, or suggestion related directly or indirectly to the course. The specific forum, on the other hand, is dedicated specifically to discussions of topics related to the course. Typically, after a number of lectures, I post a question related to those lectures in the specific forum. The use of the forum as a type of learning activity provides interactivity, as the students can give a response and their colleagues can add or comment on that response. This generates a discussion thread that leads to close interaction among the students, the extent of which rarely is achievable in the conventional classroom. I design questions that test the understanding of concepts/principles and that test the students' ability to apply these principles when solving practical problems. The forum includes several categories, such as 'Things to Ponder', 'Stop and Think', 'Let's Crack Your Head', and 'Mind-Bending Exercise'. Students are given a specified time during which they can send a response to the forum. After each exercise in the forum, I discuss the question and some of students' responses. I do not provide a direct answer, but instead I discuss the various possible approaches to address the questions by applying the concepts that the students have learned. The forum has provided me with very useful information to assess the students' understanding of the lecture materials and where they are falling short. This gives me time to clarify certain concepts, and usually I take this opportunity to provide additional examples to illustrate the concepts.

Quizzes & Games—These learning activities are focused on providing students with an understanding of the related concepts using the element of fun. I use different types of quizzes (e.g., fill in the blank, multiple choice, and matching pairs). The word game that I developed has been very popular (see feedback from students). This game is similar to 'Wheel of Fortune' (i.e., a clue is given and the student must click the letter next to the correct answer). The interactive crossword puzzle is another game that I use.

Extensive learning resources—The students have access to various learning resources, such as selected website links, handouts (pdf), PowerPoint slides, articles, videos, and online lectures. For selected lectures, I prepare an online lecture that the students can view at their convenience or for revision of their notes.

Online (virtual lecture)—The online lecture is conducted in the form of a PowerPoint presentation (converted into Flash format) combined with narration. Preparation of a good online lecture is strenuous and very time consuming. It involves preparation of the slides, a script for each slide, recording and editing the video, recording the audio, and finally combining everything into a single presentation. How useful is the online lecture? Online lecture can be used effectively to add another dimension to the classroom lecture. Although many food science/food processing

concepts can be learned in a classroom, they can be greatly enhanced by reaching beyond the walls of a lecture room. In an ideal situation, it is best to teach a principle or concept using a hands-on approach or by a direct demonstration. Imagine teaching a student about Lane-Eynon titration to determine the reducing sugar content. This is an empirical method and the reaction is non-stoichiometric, thus strict adherence to the procedure is critical to obtaining good results. A video recording of the whole experiment can be made, and critical steps of the titration can be highlighted. Similarly, when teaching a food processing operation (e.g., extraction and refining of vegetable oils), each step of the process can be recorded in visual form and combined with narration. These examples represent a different form of pedagogy (teaching methods) that can be fully utilised for effective teaching that will greatly benefit the students.

Development of the Virtual Food Science & Technology Library website

This website serves two functions: first as a research bulletin for the research group and second as a one-stop reference centre for food science/technology students across the globe. My vision is to establish this website as a credible, authoritative, and respected source of knowledge on food science, technology, food safety, and product development. To achieve this objective, my Food Science & Technology Virtual Library (FST Virtual Library) includes all of the relevant resources and links on food science and technology. In a sense, it acts as a repository centre that includes documents in various forms. Lecture notes and PowerPoint presentations can be made available in the form of pdf files or in the original format (.doc or .ppt). In addition, recorded presentations (seminars, conferences) will be converted into a suitable video format (mainly Flash, mpeg, etc.) to suit the different download speed of various modems. Although many food science/food processing concepts can be learned in a classroom, they can be greatly enhanced by reaching beyond the walls of a lecture room. When I teach about production of snack foods, I explain the sequence of the process and show picture and video clips of each stage of the process. The students can view the presentation repeatedly, either for revision of their notes or to get a better understanding of the process. This is a great way to add value to classroom teaching because very often the time available to cover the course material is very limited.

PERSONAL AND PROFESSIONAL DEVELOPMENT

"A journey of a thousand miles begins with a single step"

(Chinese philosopher; 604–531 BC)

"When it comes to teaching, most of us are still learning. Teaching is a complex activity, and yet most of us have not received formal training in pedagogy. Furthermore, teaching is a highly contextualized activity because it is shaped by the students we have, advancements in our respective fields, changes in technology, and so on. Therefore, our teaching must constantly adapt to changing parameters"

Ambrose et al., 2010, How Learning Works

To teach is to learn twice. Constructivism, behaviourism, pedagogy, andragogy, Bloom Taxonomy, student-centered learning...? I must humbly admit that, in the first few years of teaching at the university, I did not know much about the various learning theories and pedagogical aspects of teaching-learning. I think that most university lecturers (except those with an education background) do not have sufficient knowledge of and exposure to pedagogy, learning theory, or instructional methods. I am not trained as a teacher, I am a food technologist. My only experience in teaching was teaching my friends and a short stint teaching in a private school (secondary level). Soon after I completed my Ph.D. in Food Technology, I joined the university as a lecturer, and when I began I did not have the slightest idea how to teach adult students.

During the first few months after joining the university, I attended induction courses, including one or two sessions on teaching and learning. I do not think I learned much about learning theory or pedagogy then, but I still remember a session in which I had to give a mock lecture that was recorded and later commented on by the facilitator. That was the extent of the training I received to become a teacher (lecturer), and with it I was supposed to be ready to carry out the task of educating adult students. Without sufficient knowledge of pedagogy and teaching techniques, I had no choice but to use my intuition, and I developed my own approach based on my limited understanding of what good teaching means.

It is clear to me now how much more there is to learn and how much more there is to do. Knowledge of the subject matter alone is not sufficient to be an effective teacher. Developing mastery in teaching is a continuous learning process. Therefore, I continue to learn and enrich my knowledge so that I can be a better teacher for my students. Not having formal training in teaching is not an excuse for not doing anything to improve my teaching skills. I know that if I want to improve my teaching and enhance students' learning, must understand what research says about how learning works and about how to foster learning.

Looking back, I think I am a better teacher now than I was 18 years ago. However, had I not sought new knowledge via self-study, my pedagogical approach and teaching skills probably would not have changed very much. Obviously, the task of preparing teachers to teach is complex and challenging. Teachers, especially lecturers in higher educational institutions, should not take it for granted that basic training in teaching is adequate to help students to learn effectively.

Knowledge is not static; indeed, it should expand and be honed and enhanced. I believe that educators at all levels, from kindergarten to university, should always seek new knowledge, not only in their area of specialisation but also in other disciplines. To teach is to learn twice. I always believe that we can only get better, provided we are willing to learn. As someone who is not formally trained as a teacher, I am always on the lookout for good resources (books, websites, blogs, or courses) on teaching and learning. The desire to learn and improve myself has never diminished. My motivation is to enhance my teaching based on sound pedagogical principles, and in the long run I hope that this approach will benefit my students' learning.

I ask myself, with what kind of new knowledge, skills, and competencies should teachers equip themselves? In this regard, Paulsen (2001) proposed that teachers should master three types of knowledge: (1) content knowledge—knowledge of the facts, principles, and methods in the discipline that is being taught; (2) pedagogical knowledge—understanding of the learning process and the conditions that facilitate and hinder it, independent of the discipline in which the learning takes place; and (3) pedagogical content knowledge—a term coined by Shulman (1986) to denote knowledge and understanding of the learning process in the context of a particular discipline.

It goes without saying that mastery of the subject matter (theories, principles, and concepts) is essential to help students learn the subject. Assuming that one has mastered the subject content, one also has to understand how students learn (i.e., the learning process). In this regard, a teacher should have some basic understanding of learning theory, Bloom Taxonomy, etc. Next, according to Shulman, a teacher should also have a pedagogical content knowledge. This represents 'the blending of content and pedagogy into an understanding of how particular topics, problems, or issues are organised, represented, and adapted to the diverse interests and abilities of learners, and presented for instruction' (Shulman, 1986). In other words, teachers with good pedagogical content knowledge are able to explain and transfer the knowledge of content to their students with clarity and meaning. This means that the teacher would design the teaching approach in such a way and using appropriate techniques (e.g., demonstration, graphic representation, video, factory/site visit, interview, role playing, games, etc.) to make the subject comprehensible.

As an example, in my courses I always use demonstrations in the classroom to illustrate certain concepts. In designing a suitable demonstration, first I need to have an in-depth understanding of the concept myself. Next I think of a way to demonstrate it in the simplest possible manner. There are at least two reasons for such an approach. First, it lets the students see the relevance of the information to their life and career. Second, it helps the students own the knowledge; they can see with their own eyes and hear with their own ears what the concepts mean for them. Apart from demonstration, I also frequently use analogies to illustrate certain abstract concepts.

I also ask myself, how do teachers obtain new knowledge in their subject matter (content knowledge), pedagogical knowledge, and pedagogical content knowledge? This can be achieved in several ways, and below I share my own approaches.

Attend short courses

I constantly try to further develop my knowledge of my subject area (food science and technology), instructional methods, and educational technology by attending relevant workshops/short courses. Attending short courses related to one's discipline is a good (and quick) way to improve knowledge and gain an in-depth understanding of the subject. By attending such courses, I learn things that are not normally found in a textbook. Many years ago I attended a 5-day intensive certification course in Australia that was led by an instructor with more than 25 years of practical experience in the field. He shared his real industrial experiences, and most of the examples given were from his consultation work with industry. This was invaluable knowledge that could not be found in a standard textbook. The knowledge I gain from these courses significantly benefits my students' learning and adds value to my courses.

With respect to pedagogy, I have participated in a workshop focused on using technology in the classroom, learning management systems such as Moodle to develop e-learning courses, developing modules, and introducing active learning into the classroom. The ideas and information I gained

from this workshop led me to make significant modifications to my teaching approach, experiment with problem-based learning, try new pedagogical approaches, and use new tools to help enhance my students' learning experience. These efforts, taken together, result in continuous efforts to refine, change, remove, and add both to the content of my courses and to the methods I use to deliver that content.

With other participants in a short course on Thermal Process Supervisory Certificate, Melbourne, Australia.

Reading

I always look for interesting resources (books, articles) and ideas to incorporate into my lectures and classes. Reading fuels both my teaching and my research, as I am constantly exposed to new ideas, techniques, and points of view. Regarding pedagogy, I have found several books that I would recommend to my fellow educators; reading these would provide at least a rudimentary knowledge of pedagogical principles and approaches:

- Alan Pritchard (2009). *Ways of Learning – Learning Theories and Learning Styles in the Classroom*, 2nd edition. This book presents basic theories on learning, followed by the two major schools of psychology that have dealt with learning: behaviourism and constructivism. I like the simplicity of the presentation; it provides a good introduction to these concepts for novice teachers without a background in education);

- Susan A. Ambrose et al. (2010). *How Learning Works – 7 Research-Based Principles for Smart Teaching*. [Excerpt from the website: 'It introduces seven research-based principles of learning and addresses issues such as prior knowledge, knowledge organisation, motivation, and metacognition. Written to be accessible and practically useful, this book helps to explain why certain teaching approaches do or do not support student learning and provides faculty with a framework for generating effective approaches and strategies in their own teaching contexts'].

- Barbara Gross Davis (2009). *Tools for Teaching*, 2nd edition. [Description copied from the preface: 'Tools for Teaching provides new and experienced faculty in all disciplines with practical, tested strategies for addressing all major aspects of college and university teaching, from planning a course through assigning final grades'].

Educational websites and blogs

Educational websites and blogs are very useful sources of information and new knowledge about subject content and on pedagogy. For example, in the field of food science and technology, the Institute of Food Technology (USA) website publishes the latest information on various aspects of food science and technology (e.g., processing, ingredients, nutrition, and food safety). As for pedagogy and teaching/learning, many good websites exist, including Faculty Focus (http://www.facultyfocus.com), Edutopia (http://www.edutopia.org), The Chronicle of Higher Education(http://chronicle.com/section/Home/433), and Times Higher Education (http://www.timeshighereducation.co.uk/). Some websites, such as Faculty Focus, provide free articles that are downloadable as a PDF file. Over the years, I have amassed a huge collection of articles from various websites. Although I have not read them all, I know that there is a pool of knowledge on my computer waiting to be tapped.

Blogs and social community network groups are useful sources of information, as this is where educators meet online to discuss and share their thought on various issues. One example is Classroom 2.0 (http://www.classroom20.com/?xg_source=badge) (a social network for those interested in Web 2.0 and Social Media in education). The Rapid E-learning blog (http://www.articulate.com/rapid-elearning/) and the informative blog ZaidLearn (http://zaidlearn.blogspot.com/) are useful sources of information about using technology.

Journals

When looking for the latest research in a given discipline, there is no substitute for reading peer-reviewed journals. Generally there are two types: review journals, which publish review articles, and research journals, which publish original research findings. Some journals are only accessible if your institution has a subscription. Others are accessible free of charge through open access. There are a number of open access journals in education, including the International Journal for the Scholarship of Teaching and Learning (.http://academics.georgiasouthern.edu/ijsotl/v5n1.html).To find an open access journal, simply go the extensive online catalogue titled Directory of Open Access Journals (DOAJ) (http://www.doaj.org/). 'This service covers free, full text, quality controlled scientific and scholarly journals. We aim to cover all subjects and languages. There are now 6175 journals in the directory. Currently 2631 journals are searchable at article level. As of today 510028 articles are included in the DOAJ' (DOAJ, 2012).

To improve pedagogical content knowledge, there are journals in certain disciplines that focus on the pedagogical aspects of teaching/learning the content of the discipline. Just to mention two examples, in chemistry there is the *Journal of Chemical Education* (co-published by the ACS Publications Division and the Division of Chemical Education) and in food science we have the *Journal of Food Science Education* (available free online, co-published by the Institute of Food Technology, USA and Wiley).

There is so much that teachers/lecturers/faculty members can do to further their own professional development. The bottom line is that continuous professional development of teachers can no longer be viewed as just an option; it is a necessity if we are to enhance the standard of education at all levels.

CLOSING REMARKS

I believe that at the heart of teaching excellence lies the teacher's ability to inculcate and strengthen intellectual qualities such as independent learning, thinking, and inquiry, critical thinking, creative problem solving, intellectual curiosity, intellectual skepticism, informed judgment, and articulateness. Teaching, above all else, brings me great joy. It is the joy of seeing the best students excel, seeing the pride of the average students performing better than they thought possible, and seeing the satisfaction of the lesser student persevering when they thought they couldn't make it. As I look back at the last 18 years of teaching at Universiti Sains Malaysia, I feel joy coupled with humility that I have touched the lives of many, many people, and, in return, they too have enriched my world. In summary, I continually strive to teach with clarity, passion, empathy, and sincere enthusiasm, which I hope will effectively impact learners, connect them to their passion, and, ultimately, make them into lifelong learners. For the rest of my career, I will be looking ahead, trying to be the best teacher I can possibly be.

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PART 2
CHAPTER 2

BEYOND THEORY—WHAT IT TAKES TO BE AN EFFECTIVE TEACHER: MY EXPERIENCES AS A BUSINESS EDUCATOR

Zainal Ariffin Ahmad

INTRODUCTION

While finishing my doctoral studies at Northern Illinois University (NIU) in 1994, I was recruited to work at Universiti Sains Malaysia (USM) by the Deputy Vice Chancellor Dato' Professor Ishak Tambi Kechik and the Registrar Dato' Hajah Maznah Saad, who were on a recruitment drive across the United States. I attended the briefing held at the home of a USM faculty member who was studying at NIU. A few weeks before graduation in April 1994, I received a phone call from the USM Human Resources Unit and an official offer letter via courier. Two days after I returned to Malaysia, I reported for duty at the School of Management on 6 June 1994, and I was welcomed by the then Dean, Professor Mohamed Sulaiman. I attended the mandatory 2 weeks of induction, during which I met 50 other administrative and academic colleagues from around the university, many of whom became lifelong friends. For my first teaching assignment for semester 1 of 1994–95, I was assigned to co-teach AKW101 (Introduction to Management for minor students) with a senior colleague, Mr. Shafie Ariffin. I felt like a rock star on the first day of class: We had 700 students sitting in the aisles of Dewan Kuliah W, which is a hall fit for 400. We later split the class into two sections. Thus began my journey at USM after 11 years of studying and working in the United States. This is the story of my trials and tribulations as a business educator at USM.

MY TEACHING PHILOSOPHY

As a business educator and human resource developer, I was trained to have a credo (or philosophy) of teaching to guide how I should conduct myself as an educator. This credo is my

code of conduct and professionalism. Hence, since 1994, I have firmly upheld the following teaching philosophy: 'I am a lifelong learner, therefore I believe that learning should be fun, meaningful, and lifelong'. This philosophy has guided me throughout my years of teaching at USM, and it is evidenced in the teaching and learning activities that I describe in subsequent sections.

MY TEACHING APPROACH

Adult Continuing Education was my specialization for my Doctor of Education (EdD) degree. Therefore, with my thesis (Ahmad, 1994) in hand, I arrived at USM ready to share adult education theories and andragogical approaches as I was preparing to be a teacher/trainer of working adults. Andragogy is the art and science of helping adults learn, and teaching-learning is learner-focused education for people of all ages. This differs from pedagogy, which is the art and science of educating children and which still tends to be teacher focused. However, recent developments in education push for more student- or learner-based instruction, which has been discussed earlier in this book.

I practice and am guided by concepts (i.e., my 'tok gurus' (fellow teachers)) in adult education, such as andragogy (Knowles), self-directed learning, student-centred learning, learning how to learn (Robert Smith), and others such as those posited by Kidd and Mezirow. I was also influenced by my late supervisor, Professor John Niemi, and the human resource development movement. Simply put, as an adult educator I practice adult learning principles or adult learner-centred teaching. Thus, I strategize my teaching delivery around the four characteristics of adult learners:

- A different orientation to education and learning: Students come to class with different agendas about what, how, and when they want to learn. I seek to understand their learning expectations.
- An accumulation of experience: I try to draw out the students' rich experiences through activities such as student-led class discussions or an activity in my Human Resource class "HR in Practice" where the students share their experiences about real-life HR practices in organisations.
- Special development trends: Students may have problems with eye sight, retention, and attention, which have implications for the font size I use on my PowerPoint slides and reading materials.
- Anxiety and ambivalence: Many students are concerned about exams and assignments. To address this, I teach them the skill of 'learning how to learn', and I give sample exam questions on the first day of class.

In most of the graduate classes I teach, I like to have a 'kopitiam' (traditional Malaysian coffee shop), round table, or hollow-square set up in the classroom, as this encourages interaction among the students and allows them to share their accumulation of experiences (Figure 1). On the first day of class, I go through the course syllabus with the students and tell them what is expected of them in terms of deliverables. I also tell them the areas that will be covered in the exams, essay topics and how I expect their essays to be written, and I provide sample exam questions. This helps to alleviate their anxiety about the exams and their ambivalence about learning. I use adult learning principles in all of my undergraduate/graduate classes. Looking back, I have taught 63 classes and almost 7,400 students at USM over the past 16 years (Table 1).

Table 1: Summary of Classes Taught from 1994-2010 in USM

Taught	Undergraduate	Graduate	Total
Classes	28	35	63
Students	6,823	570	7,393
Year 1	ATW/JTW 101 Management ATW/JTW 106 Psychology	AGW/AGU 609 HRM AGW 613 OB AGW 621 Research Method AGW 655 Intellectual Capital	MBA MBA SSME
Year 2	ATW/JTW 252 OB AKW 202 OB	ADW 613 OB ADW 609 HRM	MBA online
Year 3	AOP 351 HRM AOP 354 OD ATU 398 Independent Study	AGW 703 HRM AGW 708 Current Issues AGW 710 Consultancy AGW 711 Teaching & Training AGW 727 Consultancy	DBA

As an adult educator, I subscribe to the andragogical approach and see my graduate students as my co-learners, be it in my MBA (Organisational Behaviour (OB), Human Resources Management (HRM)) and Doctor of Business Administration (DBA) courses (HRM, consultancy, teaching, and training techniques) or in the PhD program. We discuss literature and cases, role play, and do hands-on work in a relaxed atmosphere on a first name basis. We also chat online via group list/email, SMS, and mock viva. I meet with my MBA/DBA/PhD students anywhere (in the world) to discuss their theses, including airports, terminals, sidewalk cafes, or even shopping malls in Dubai and Medan. Learning happens anywhere and anytime.

LIFELONG LEARNING
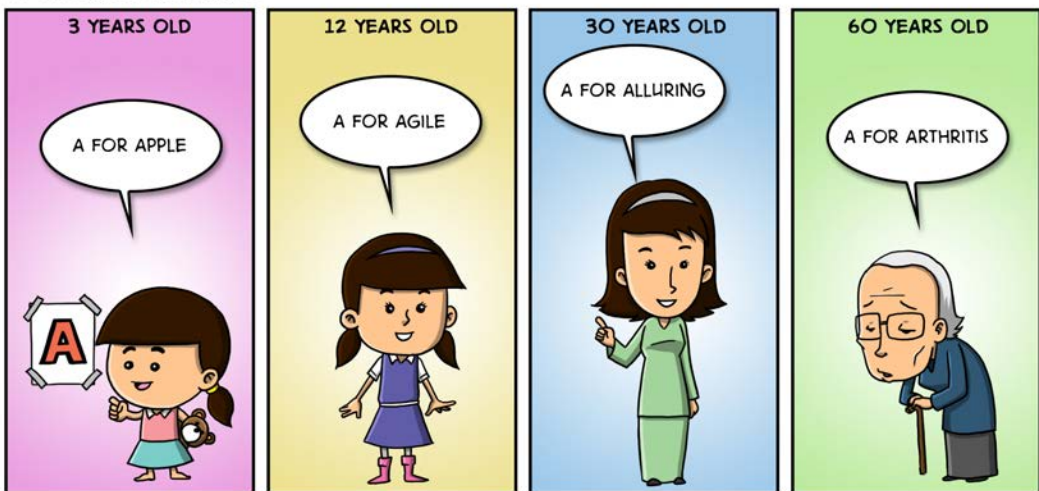
I am very proud that many of my PhD students are doing well academically. Three of them recently received their Professorships, one of whom is the Dean of Business at Universiti Teknologi Mara. Many of my MBA students are also progressing in their careers in industry. I take pride in my graduates' successes. By the time I retired from USM in 2010, a total of 68 postgraduate candidates (17 PhD, 2 MA/MSc, 44 MBAs, and 5 DBAs) graduated under my supervision (80% after I became an Associate Professor) (Table 2).

Table 2: Summary of Teaching and Supervision as a Lecturer and Associate Professor

Total outputs/outcomes	Lecturer		Associate Professor	
17 PhD	1	6%	16	94%
5 DBA	–		5	100%
2 MA/MSc	–		2	100%
44 MBA	12	27%	32	73%
68 Total student supervised	13	19%	55	81%
Undergraduate Classes taught*	22	79%	6	21%
Graduate Classes taught	1	3%	34	97%

* not including teaching in franchise programs - under consultancy

Creativity in teaching

On 5 August 2009, I was conferred the prestigious *Anugerah Akademik Negara* (ANN) award (National Academic Award) for Teaching 2008 for the Applied Arts and Applied Social Sciences (Figure 2). This highly competitive award was based on three criteria:

● Innovation
● Effectiveness of teaching and learning
● Teaching materials and assessment

My teaching partner, Professor Abd Karim Alias, who received the AAN Teaching Award for the Sciences, and I were invited to give talks to academicians at 10 local and international universities around Malaysia. During those talks, I shared my 10 innovations in teaching, as listed below:

1. Practice adult learning principles – be **adult learner-centred**
2. Use **movies and literature** to illustrate concepts and applicability of theories
3. Have students work in **diverse teams** of five (i.e., inculcate diversity)
4. Have highly interactive student-centred classes (e.g., lecturette, role play)
5. **Problem-based learning** – focus on learning issues, use evidence-based teaching such as Forensic Human Resource

6. **Bundle popular books** with textbooks (e.g., HR Scorecard, Blue Ocean Strategy, Five Minds of the Future) as frameworks to evaluate HRM

7. Discuss **HRM in practice** – MBA candidates share their company's HRM in class

8. Put in place a **HR Shadow** program – undergraduates shadow an HR executive for a day

9. Use **case study** development and case analysis – submit results to Case Writers Association of Malaysia

10. Foster **Future thinking** – Using future concepts such as Angkasawan (Malaysian Cosmonaut) as future managers and elaborate discussion on my future classroom

I have always inculcated innovations and creative teaching methodologies, especially in teaching applied subjects such as management, psychology, organisational behaviour, and HRM. My message is very clear: Teach with passion and make learning fun and meaningful through innovative and creative teaching. Most importantly, I expect only the best quality in my students' work, and I accept nothing less. Hence, it motivates them to be creative and innovative in their assignments, and they are rewarded for it.

Figure 1: Kopitiam classroom

Figure 2: Recipient of the *Anugerah Akademik Negara* award 2008

Making learning meaningful

To make learning meaningful and fun, I use literature and movies to illustrate concepts and applicability of theories in general management, OB, or managerial psychology. When I started teaching in 1994, I asked my undergraduate and graduate students to review traditional Malay literature (*Sejarah Melayu* and Hang Tuah), Chinese literature (Sun Tzu's Art of War, Three Kingdom, I-Ching), Indian literature (*Mahabharata*), and/or religious holy books such as Al-Quran, the Bible, or Confucius teachings. I asked them to select plots from the literature and draw parallels to the specific theories either in management, OB, psychology, organisational development, or HRM. For example, students selected Malay literary works and evaluated them using OB theories. These were later published to show the relevance of classical literature in modern management (e.g., 'The Malay Annals: Classical Work as Study Text for Organisational Behaviour' in the Journal of Humanities (1998) and 'Malay

Studies in the 21st Century' in *Pemikir* (1999). In one class I asked students to study Hang Tuah and evaluate him based on the leadership theories we discussed in class. Graduate students had to review a minimum of 20 articles related to the topic they wished to study and write a literature summary and literature review. This assignment was to help them prepare for conducting a literature review for their management projects.

As for movies, I have used P. Ramlee movies when teaching ATW106 Psychology for Management. I asked student to identify and act out scenes from the movies and write a report on particular emotions found in the movies. To keep this fun, we had best actor and best actress awards during the group acting session (Figure 3). I even wrote an article titled *Learning about Emotions through P. Ramlee Films: An Experiential Approach* and presented it at the Asian Applied Psychology International Regional Conference, Bangkok, Thailand in November 2005.

Figure 3: Best Actor and Actress in Psychology P Ramlee

Figure 4: Anakku Sazali vs. Sepet for SHE 101

The concepts of 1 Malaysia and 'unity in diversity' were recently reintroduced into our society, and I challenged my students to look at these issues academically in assignments using P. Ramlee as well as contemporary movies. For example, in one assignment for the mandatory Ethnics Relations Course (SHE 101), my students had to critically analyse and compare race relations and gender issues highlighted in P. Ramlee's '*Anakku Sazali*' versus the contemporary Yasmin Ahmad's '*Sepet*' (Figure 4).

Besides local films, I have used a variety of recent blockbuster movies, such as Titanic, Bicentennial Man, Happy Feet, and space-or future-oriented movies (Star War Trilogies), that relate to the Angkasawan Program (Figure 5). One standard feature of my class is that we usually begin the first class period by watching clips of the films. This sets the tone for the whole semester. For example, when Titanic hit the screens in 1999, I put on a PALAPES navy suit and became Captain Smith as I showed Titanic and Bob Ballard's National Geographic specials in ATW101 Introduction to Management. My weekly lectures and assignments for that semester related to the managerial issues observed in Titanic: Why did management fail in Titanic?

Figure 5: Sample movies featured in Dr Zainal's classes from 1994 to 2008

Unity in diversity in the classroom

Long before the resurgence of 1 Malaysia, I expected all of my undergraduate and graduate students to work in teams of five that consisted of individuals from different backgrounds in order to train them to work in a diverse group (Figure 6). Regardless of differences in race, gender, sexual orientation, or state of origin (Kelantan versus Penang), students have to write a report about their experiences and what they can learn from people who are different from them. The demographic distribution in my management classes has shifted over the years since 1994: The number of female students increased from 45% to 85% percent, and the majority shifted from Malay to Chinese students. In some classes, the ratio was 4 females to 1 male, and I mandated that the group leader could not be male, as the tendency was to appoint the sole male as the leader. Some students argued that they did not want to work with students from the 'other' groups (meaning 'races'), but I held firm and told the students that they may leave my class if they do not want to learn to work with other races. However, I pointed out that as future managers, their superiors/subordinates and customers may not be of the same race. Like it or not, they consented, and a few thanked me for doing so long after they graduated.

Figure 6: Multiracial teams

Student centredness and interactivity

Both my graduate and undergraduate classes are highly interactive and student centred (Figure 7). To achieve this, sometimes I become a TV talk show host, like Oprah or Aznil. For the graduate classes, a typical 3-hour night class is divided into three segments: i) a mini lecture (or lecturette) on key points of the topic of the day followed by a break for prayers, ii) student-group led activities, and iii) student presentations (Figure 8). At the end, I conclude with any missed points. In line with adult learning theory, I try to draw out the students' experiences to enable knowledge sharing among them; interactive classes, role playing, and validating their experiences with theories via the lecturettes are effective tools to achieve this goal.

Figure 7: Interactivity in class – eve of Merdeka 2008

Figure 8: Student-led class discussion

For undergraduate classes, which tend to be large (50–300), I adopt a different participative strategy for the more passive students, as they may not have much experience to share. Besides giving points for participation, each five-member team is assigned a topic in the syllabus, and it is responsible for giving a presentation, leading the discussion, or acting out the concept. In one class we used Happy Feet as the focal point, and the students acted out the penguin dance from the movie to illustrate the relevant theory that they were analyzing.

Unity + Diversity = Creativity

Interactivity can be implemented within as well as outside the classroom. In each of my classes every semester, I find a reason to have a celebration. Depending on the major holidays in the semester, I encourage students to hold potluck parties and bring food to share in class to celebrate Chinese New Year, Hari Raya Aidilfitri, or Deepavali. In one class on the eve of 31 August, we held a Merdeka celebration (Independence Day) (Figure 7). Sometimes international students bring their traditional cuisines, such as food from Iran, Pakistan, and Indonesia, to share. After the feast, the students help clean up and distribute the leftovers.

Interactivity also transcends the classroom. In both my graduate and undergraduate classes, I invite practitioners to share their experiences and provide real-life examples. Some of the invited speakers have included industry leaders such as Tuan Haji Rozalli, Chairman of the Electronics Manufacturing

Services Benchmarking Council (EMSBC) (Figure 9); Mr. Khoo Cheok Sin, Vice President of the Federation of Malaysian Manufacturers (FMM) (Figure 10); and Mr. Kenny, Malaysian Trade Union Congress (MTUC) Secretary. For the DBA Effective Teaching and Training Techniques class, my co-facilitator and I often invite Dr. Asma Abdullah, Malaysia's only Corporate Anthropologist, to share her experience with Esso (Exxon). For the DBA Consultancy class, we invite Ms. Sharifah Maria Alfah, former Asia-Pacific Vice President for HR and General Affairs for Seagate, who was one of the highest ranking women in the electronics and electrical industry in the Penang Free Trade Zone. I also take the opportunity to invite faculty members visiting from other schools to visit or conduct guest lectures (e.g., Professor Hiroshi Shimazaki of the University of Leithbridge, Canada; Professor McShane of Australia; and Professor Schemerhorn of the USA).

Figure 9: Tuan Haji Rozalli (EMSBC)

Figure 10: Mr Khoo Cheok Sin (FMM)

Does interactivity work? There are pros and cons to interactivity. Some adult students still expect the lecturer to simply present the required information, as evidenced by the testimony from one student from Palestine who wanted me to lecture more. In general, however, an interactive class beats the boredom and monotony of the lecturer, and it allows the students to take ownership of the learning process. Here is one testimony:

Date: Fri, 5 Oct 2007 16:19:55 +0800
From: "Leena Devi Ganesh" leenadevi@gmail.com
To: "Zainal Ahmad" drzaba2001@yahoo.com
Subject: Re: LAST CLASS and Submission of BOS cases, HRM in practice & 5 exercise

Thank you Dr. I really appreciate it. I have this project going and everything has been given to me in the last minute so that really tied me down. I have attached the Literature paper in this email. I will send another email for the 5 exercises.

Personally I feel, the HRM class is the most interesting one I have attended so far - not only for MBA papers, but comparing to my undergrad classes as well, I think this class was the most interactive one. Some lecturers did try to make it interactive but most of the times, it falls short from the "interactiveness". AGW609 managed to keep the topics alive and I really did learn many new things. Thank you for the great experience you have given to us.

I wish USM can make more classes as interactive as HRM.

Problem-based learning

When the School of Management decided to embrace problem-based learning in 2005, I was very happy, as I already had been practicing it in my classes. With problem-based learning, the focus is on the learning issues. The idea is to organise the semester based on a set of particular problem(s) that require the students to work in teams and employ or apply the tools and strategies developed through the materials covered in class. The students' role is to identify the learning issues for each problem. The semester can be grouped into segments as follows:

- Discovery Week: Identify the learning issues, find out what the learners don't know from the problem given and what they need to find out; discuss the learning issues
- Teaching Week/Peer Teaching: After identifying the learning issues, the groups break down the tasks of fact finding and doing research. They then come back and teach the rest of the group/class. The class gives feedback on each group's presentation.
- Lecture Week: The lecturer provides missing links, debriefing notes, leads exercises from the text, and discovers blind spots.
- Monitoring Week: Learning quizzes are given (not graded, only to check understanding)

In employing problem-based learning throughout the 14-week semester for my Human Resource Management class, I group the different topics to be covered into the following three logical groupings:
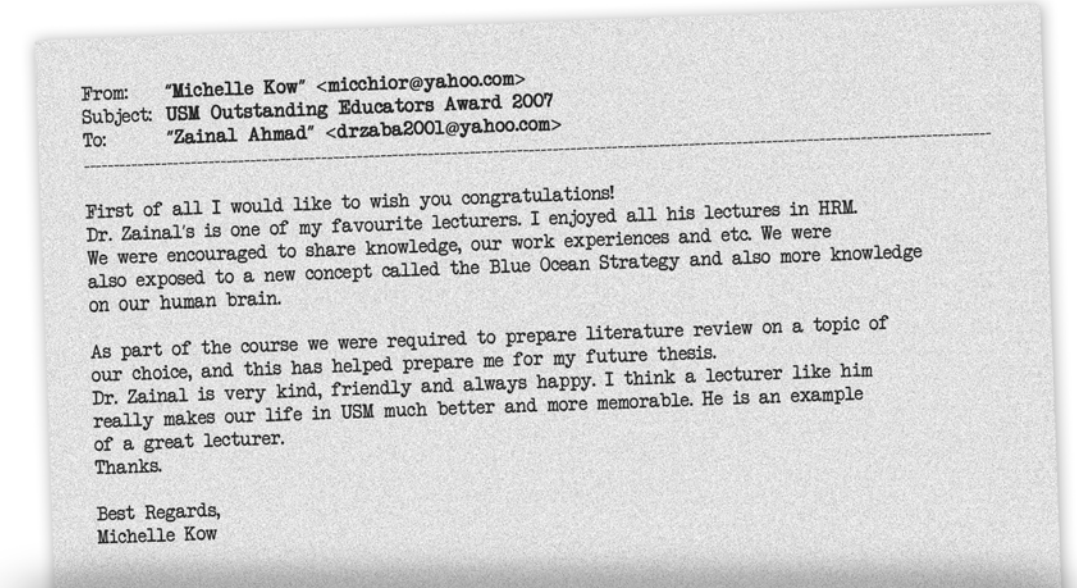
- Week 1: Close Down the HR Department (Running Theme)
- Weeks 2–5: Acquiring HR Capability – Marriot's
- Weeks 6–8: Developing HR Capability – Good Look
- Weeks 9–12: Compensating HR Capability - Intel

With the overall problem of 'Close Down the HR Department' as the running theme, we divide the semester into three big problem areas—acquiring, developing, and compensating HR capability. For each problem area, the students have to read and analyse a particular case (Marriot's, Good Look, Intel) and identify the learning issues (i.e., what they don't know and/or need to know in order to solve the HR problems). The students can refer to the textbook as a guide. The students form groups, and each week one group is assigned to uncover the learning issues. After identifying the learning issues, each group break down the tasks of fact finding and conducting research on the learning issues. Each week, the group conducts teaches the rest of the class about what they have found out. The class also gives feedback on each group's presentation. At the end of the semester, I conduct a wrap-up of the problem or learning issues and provide missing links and debriefing notes, and I also cover any blind spots or things not covered that should have been covered by the groups. In terms of monitoring, I provide sample exam questions related to the topics covered to ascertain how much the students have learned. Practicing problem-based learning encourages evidence-based teaching, whereby I teach students Forensic Human Resource to find evidences to solve the problems given.

Beyond textbooks: Bundling popular books

I believe that learning is not limited to the classroom and that students should be exposed to literature beyond the assigned textbooks and articles. Hence, I use relevant materials from popular literature. For my undergraduate classes, I like to bundle the English textbook with Perlakuan Organisasi (1998) to help students in translating the terms. I also use literature books (e.g., Hang Tuah, Sejarah Melayu, Sun Tzu) via the Kedai Koperasi USM.

For graduate students, I bundle textbooks and popular books such as HR Scorecard, Blue Ocean Strategy, and Five Minds of the Future, and students get discounts of up to RM100 when purchasing the books. These books provide frameworks for evaluating HRM issues and force students to keep up with current trends in HRM. As one student puts it:

From: "Michelle Kow" <micchior@yahoo.com>
Subject: USM Outstanding Educators Award 2007
To: "Zainal Ahmad" <drzaba2001@yahoo.com>

First of all I would like to wish you congratulations!
Dr. Zainal's is one of my favourite lecturers. I enjoyed all his lectures in HRM. We were encouraged to share knowledge, our work experiences and etc. We were also exposed to a new concept called the Blue Ocean Strategy and also more knowledge on our human brain.

As part of the course we were required to prepare literature review on a topic of our choice, and this has helped prepare me for my future thesis. Dr. Zainal is very kind, friendly and always happy. I think a lecturer like him really makes our life in USM much better and more memorable. He is an example of a great lecturer.
Thanks.

Best Regards,
Michelle Kow

HRM in practice – Bringing the workplace into the classroom

The innovation of which I am proudest is 'HRM in Practice', in which MBA candidates share their company's HRM in class and we draw from the collective experiences of the MBA students. Each student writes a brief overview of the HRM practices in their organisation and shares salient topical issues on the appointed day. Of particular interest are unique benchmark HR practices. The written report is 5–10 pages long and covers the following:

- Company profile: brief, includes number and profile of employees
- Profile of the HR department: includes number of HR staff and their functions and responsibilities, as well as the HR/headcount ratio
- HRM practices: briefly describes the HR practices or focuses on benchmark practices
- HR issues:-What do you see as major HR issues faced by your company?

Students from the same organisation may write similar company and HR profiles but must write about different aspects of HRM practices, as this is an individual assignment. Full-time students may write about their previous employers, and those without prior working experience may visit, interview, and report on any organisation. The hardcopy of the written report and the PowerPoint presentation must be submitted to me after the sharing session, and I limit each presentation to a maximum of 6 slides and 3–5 minutes. Figure 11 shows an example of the slides used for one presentation.
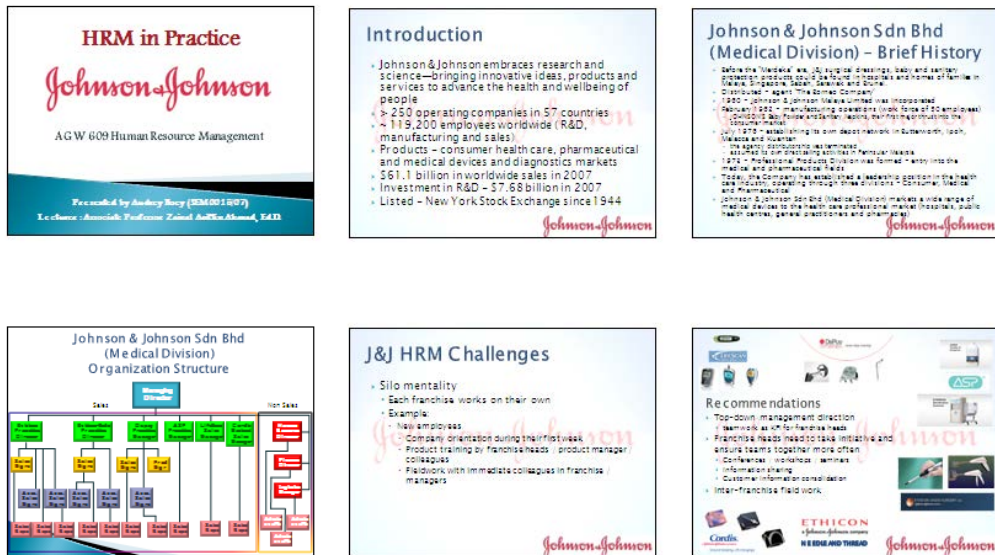
Figure 11: "Human Resource Management In Practice" in Johnson & Johnson

HR shadow

For my undergraduate AOP 351 Human Resource Management class, I have my student groups visit companies and 'shadow' an HR manager/executive for a day to get a 'realistic job preview' of what the job actually entails. I use my network of HR professionals via the Malaysian Institute of Human Resource Management, of which I was a committee member. Many students are surprised and do not expect that HR executives do things like chasing after '*Bas Kilang*' (factory buses) , waiting at the gate counting the number of operators, and doing menial and non-HR jobs. Past students have reported that this exercise gave them a better perception of the profession. Nothing you can teach from the textbook can match the experiences of actually 'being there and seeing it'.

Future thinking: Brain in space

By venturing into space, we are, therefore, investing in our children's future.

While the whole nation was awestruck when Cosmonaut Dr. Sheikh Muszaphar travelled to the International Space Station on 10 October 2007, three humble Lecturenauts—Sheikh 'Anees' Muszaphar, Peggy 'Daisy' Whitson, and Yury 'Zainal' Malachenko—were busy on Earth working with ATW 252 Organisational Behaviour students (Figure 12). They were studying Dr. Muszaphar and the implications of a 'Manager in Space' (Figure 13). Every week, the discussions in class were based on learning issues to be further discussed during tutorials (e.g., Is OB relevant for a manager in space as opposed to on Earth?).

This great journey that we are all, in a way taking together with our angkasawan, will allow our children to think that dreams can be realized.

(Abdullah Ahmad Badawi, Prime Minister at the launch of the first national Angkasawan, 10 October 2007 in KLCC.)

Figure 12: Cosmonauts Sheikh Muszaphar, Peggy Whitson, and Yury Malachenko before the launch

Figure 13: Cosmonaut Sheikh Muszaphar with the author and sons when he delivered a talk at USM on March 2008 for Brain Awareness Week

The graduate students were also bitten by the space bug, and the MBA candidates in the Human Resource Management course were asked to study the implications of 'Malaysian in Space' as follows:

Chapter (Bernardin 2007)	HRM Implications for Malaysian in Space
1. Strategic HRM	How do we plan for more Malaysians in space programs? Implication to education system, aerospace industries, universities?
2. Global HRM	Are Malaysian astronauts marketable?
3. Work Analysis and Design	How do we design/job analysis of angkasawan?
4. HR Planning and Recruitment	How do we recruit angkasawan? Online from 11,275, 2000 screened, 894 shortlisted
5. Selection and Placement	Fitness test Selection pyramid – from 11,275 to 1
6. Performance Management and Appraisal	Assessed in all aspects in communication, character, forwardness, and determination

We analysed the recruitment and selection process for becoming an astronaut as follows:

	Dates	SELECTION PYRAMID	Number	Passed
	October 2003	Online registration	11,275	
		Screening	2,000	
		Selected	884	
1	27/8–3/9/05	Fitness test: 3.5 km in 20 minutes	435	199
2	27/8–3/9/05	Basic medical examination based on NASA criteria	194	59
3	25–30/9/05	Aeromedical 1 (blood test, nasal, audio, X-ray, ECG)	59	27
4	16–21/1/06	Aeromedical 2 (bones, air cavity, centrifuge)	27	18
5	16–24/1/06	Overall assessment based on 3.5 km run, second aeromedical test, and psychiatric, psychology, land and sea survival, and technical competence.	10	8
6	25–26/1/06	Medical examination (CT scan, endoscopy, blood analysis)	10	8
7	February 06	Assessed in all aspects of communication, character, forwardness, and determination	8	4
8	March 06	The four underwent medical examination in Russia (neurology and body adaptation in microgravity environment)	4	2
9	Sept 06–Oct 07	Dr Sheikh and Dr Faiz were sent for training at the Yuri Gagarin Cosmonaut Training Centre in Star City, Moscow and then to NASA, Houston, Texas. One will fly to the International Space Station and the other is his back-up.	2	1

The brain in business

To further extend the frontiers of knowledge in business, I had the distinct opportunity of taking my second sabbatical at the University of Florida (UF), Gainesville, Florida USA from March to June 2006. There I visited the McKnight Brain Institute to learn about the neuroscience research being conducted there. Personally, I became interested in neuroscience when my 10 year old son was diagnosed with mild ADHD, and I wanted to find out if neurofeedback could help him to learn better.

In 2004, the world was introduced to the concept of neuromarketing, which sparked heated debate and interest in applying neuroscience in business. I worked on Brain Awareness Week 2005 and was interested to see the link between neuroscience research and business. In 2006, neuroleadership was introduced, and it changed the way we looked at leadership. In my editorial to the Malaysian Journal of Medical Sciences (2010), I argued that 'such convergence has given birth to a plethora of new transdisciplinary business fields with neuroscience surnames such as Neuroeconomics, Neuromarketing, Neuroaccounting, Neurogovernance, Neuroethics, and Neuroleadership. Such exotic union of science and the arts may provide better understanding of human nature and behavior change'.

I decided to pursue this line of research and applied for a USM Research University grant in 2007 to set up a research agenda looking at neurofeedback and mental health from two perspectives: neuroscience and counselling. This entailed the purchase of neuroimaging equipment for encephalogram or EEG in partnership with Professor Jafri Malin Abdullah from the Neuroscience Department of the Hospital USM. For the counselling perspective, I collaborated with Professor Susie See Ching Mey, who is a board member of the National Board for Certified Counselors International (NBCCI) USA, to bring the Mental Health Facilitator (MHF) program to USM. Two master trainers from NBCCI came to train 18 lecturers and administrators to become Mental Health Facilitators as part of the USM Mentor Program.

The Brain Science Nexus was established in 2009 with 12 different groups working on different aspects of the brain and mind at USM. My research interest was to study neuroleadership from the perspectives of transformational leadership based on Bass (1985) and Burn (1978). Unlike transactional leadership, which focuses on exchange that motivates followers by providing rewards and benefits for productivity, transformational leaders make decision based on cognitive rewards, provide a climate of trust, and draw out the followers' higher order needs to perform beyond expectations. Transformational leaders inspire their followers to make decisions that transcend self-interests. I was interested to explore whether "Can neuroimaging (EEG/fMRI) show how transformational versus transactional managers influence others?

In 2000, the Organisation Section of the School of Management established the Organisational Behaviour (OB) Lab, and I was responsible for managing it. My colleagues and I used the OB Lab as a teaching lab to showcase student works and conduct role playing sessions and profiling to reinforce learning via tutorials in the Organisational Behaviour course. In 2007, after I came back

from sabbatical with a research interest in neuroscience, the OB Lab was converted to the Human Development (HD) Lab to house the EEG equipment, and we purchased the Brain Trainer (Figure 14) for working with children suffering from learning disabilities. I secured Fundamental Research Grant Scheme (FRGS) funding to study leadership and decision making from the neuropsychological perspective and worked with Dr Azura Effendi, who received FRGS funding to study emotional intelligence and leadership. The HD Lab also houses several other business research groups working on various research projects on Small & Medium Entreprises (SME), homestay, organisational safety and health, and HR success. We also organised Brain Awareness Week 2008, which was a very successful event: Almost 2,800 school children and parents attended the exhibition and talk series ('Who Wants to be a Neuroscientist?') and the keynote address by Cosmonaut Dr. Sheikh Muszaphar. We conducted the first MHF training during that time.

When I moved to the Graduate School of Business in 2009, I set up the Business Research for Applied Innovations in Neurosciences (BRAIN) Lab to continue my work on the cognitive aspects of leadership, decision making, and innovation. The mission of the BRAIN Lab is to conduct business research and consultancy in innovations based on the neurosciences. Some of this neuroscience knowledge is applied during my consultancy and training on Creative and Innovative Behaviours, Multiple Intelligences, and Learning/Disabilities and Decision Making. I attended the EEG training in USA (Figure 15) and we moved the EEG equipment (Figure 16) to the BRAIN Lab and were able to conduct two studies there before the equipment was sent back to the Neurosciences Department at HUSM.

Figure 14: Working on the Brain Trainer in Singapore – nice earrings!

Figure 15: Me in Hydrocel net 32 channel
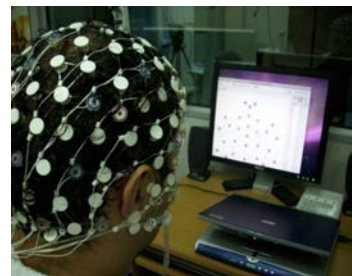
Figure 16: Watching the impedence on the E-Prime

Brain-based future classrooms

What will my future classrooms look like? For the graduate classes, I want a recessed, circular classroom with comfortable folding-arm seats, an electronic stand, four monitors/screens around the room, and iPOD surround sound (Figures 17 and 18). I would love to follow the neuroplasticity design (i.e., Professor Zalina Ismail's research), in which students can sit in groups of five in recessed seats or clumps of bean bags or low sofas. The walls/floors will be lined with power outlets. I envision an eclectic classroom design like that found in the Golden Lounge in Kota Kinabalu International

Airport, with a coffee maker and bar stools lining the back of the room for refreshments. In other words, I want to dare to be different.

Figure 17: Lounge-style graduate classroom (Kota Kinabalu International Airport)
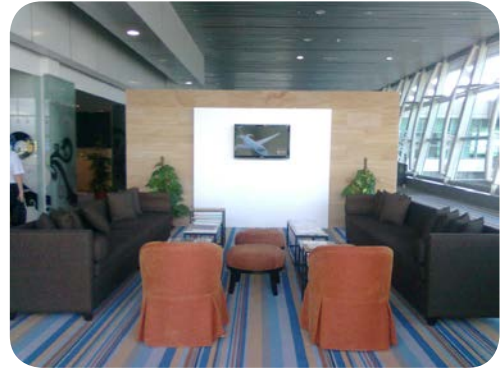
Figure 18: Sitting room-style graduate classroom (Kota Kinabalu International Airport)

My future undergraduate classroom will be a mixture of a cabaret theatre-style setup for 50–70, built in a semicircle with foldable table seats on a raised platform. The electronic music stand will control the PowerPoint and LCD projector. Screens will be placed on three walls or in front of the theatre. This setting allows for constant interaction between the lecturer and students and for engaging them in role playing. Regarding this idea, one student said:

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Date:     Sat, 26 Jan 2008 15:40:36 +0800
From:     "Wai Kin Lee" <waikin18@gmail.com>
To:       "Zainal Ahmad" drzaba2001@yahoo.com
Subject: Feedback
--------------------------------------------------------------------------------

Hi Prof Zainal,

In my opinion, the classroom serves as a student's second home. It is where they share their
thoughts, getting new knowledge and creating new ideas through interactions between
students and lecturer.

Therefore, having a comfortable and a not too formal environment (but conducive for
learning) is important to make the students participate greatly during the process of
learning. They will feel "free and easy" to get along because they do not feel any tension
in it, just like going out with friends for a drink.

So, classrooms can be easily transformed into environments of learning with simple
innovation for comfort like what you have done. I strongly believe you have created a
classroom which will be successful. I am looking forward to see it materialize.
All the best!

Wai Kin
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Summing Up

After 16 years of teaching, I retired early from USM on 1 September 2010 and moved to Kuala Lumpur to be closer to my elderly mother. Currently, I serve as Professor at the College of Graduate Studies and was appointed to start up and head the Graduate Business School at UNITEN. Reflecting on my teaching career at USM, the word TEACH sums it all:
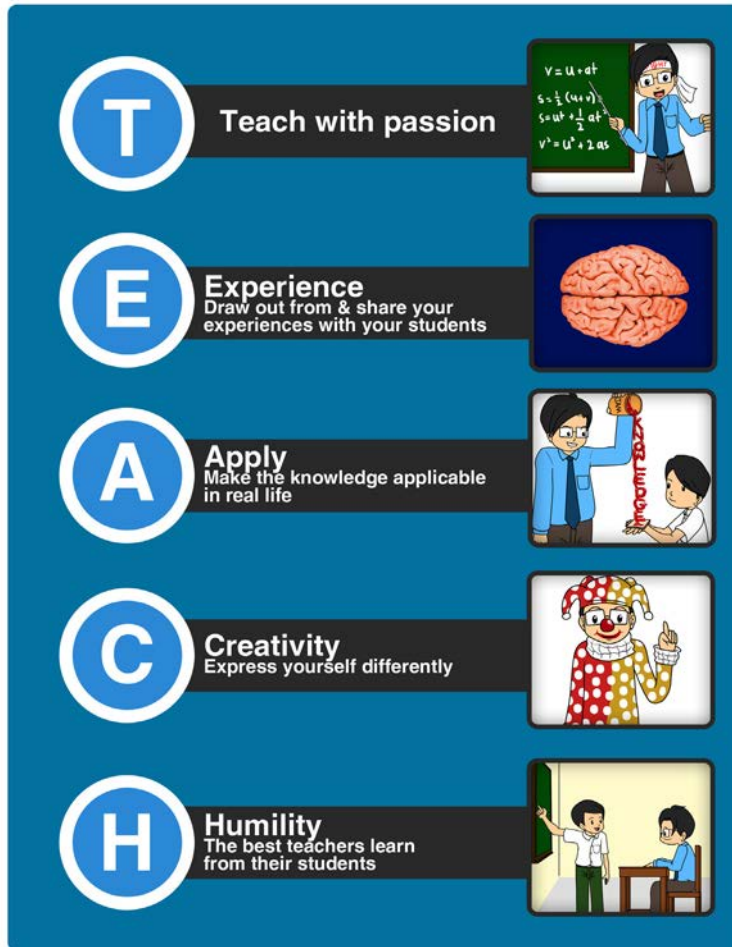
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CHAPTER 3

TEACHING THE PHARMACY STUDENT TO THINK LIKE A PHARMACIST

Azmi Sarriff

INTRODUCTION

Pharmacy is a science-based profession that deals with the study of the functions of drugs that interact with the human body so as to prevent, diagnose, and treat diseases as well as to regulate the physiology of the human body and to promote human health (Wu, 2000). How does a student become a pharmacist? Answering that question requires defining what it means to be a pharmacist, and it is important to understand that the definition has changed over time. For almost two decades, the landscape of the pharmacy practice has been determined by the concept of pharmaceutical care, which is defined as the responsible provision of drug therapy to achieve definite outcomes intended to improve a patient's quality of life (Hepler & Strand, 1990). It has been further refined to be 'a practice in which the practitioner (i.e., the pharmacist) takes responsibility for a patient's drug-related needs and is held accountable for this commitment' (Strand, 1998). Thus, instead of engaging in the traditional activity of 'lick, stick, and pour', today's pharmacist engages in and provides direct patient care. Under this new model of pharmacy practice, many pharmacists have found themselves challenged by a paradigm shift in their daily practices, as they now have to take responsibility for their patient's drug-related needs and are held accountable for them. In providing pharmaceutical care, pharmacists are required to incorporate new behaviours into their practice routine, which include:

- reviewing and screening of patient medical records;
- identifying, preventing, and resolving patient's drug-related problems;
- implementation of monitoring plans;
- documentation of care plans;
- referral and consultation with other healthcare professionals;

- patient advising and counselling; and
- provision of health information to patients.

In addition, the World Health Organization (WHO) introduced the concept of the 'seven-star pharmacist' to define the roles of a pharmacist: The seven stars refer to the pharmacist's role as a caregiver, decision maker, communicator, manager, life-long learner, teacher, and leader. 'Research' was later added as an eighth category (i.e., eight star pharmacist) (WHO, 2006) According to the WHO, a pharmacist must possess specific knowledge, attitudes, skills, and behaviours to support these roles (Table 1). These roles dictate that pharmacy students must learn technical knowledge about drugs and also gain self-confidence that will help them to identify themselves as professionals.
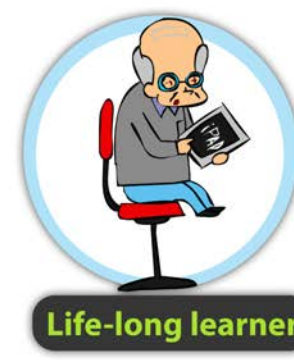
It is by no means an easy job to prepare our pharmacy students to face the challenges in the new millennium. We now are facing new challenges that are likely to influence our pharmacy practices and, most importantly, the educational needs of our students. Globalisation, scientific and technology advances, information and communication technology, and changes in our societal and health care trends are among the factors that will affect the pharmacy profession in the future. These factors must be considered when developing and designing the pharmacy curriculum, as how we teach our students to practice pharmacy today and in future is critical. The pharmacy profession will continue to evolve, and we need to equip today's students with the knowledge and skills necessary to provide direct care to patients with the sole purpose of identifying and resolving drug therapy problems.

Table 1: The eight star pharmacist

| Roles of a pharmacist	Description
1. Caregiver	Pharmacists are in the position to respond to symptoms described by members of the public by providing advisory services, initiating therapy, or referring such persons for medical advice when necessary.
2. Decision maker	Pharmacists are in an ideal position to assist the patient on the purchase and correct use of any medicine, as well as the appropriate, efficacious, and cost-effective use.
3. Communicator	Pharmacists are in an ideal position to provide a link between the prescriber and the patient and to communicate information about health and medicines to the public.
4. Manager	Pharmacists must be able to manage resources (human, physical, and financial) and information effectively.
5. Life-long learner	Pharmacists should learn how to keep their knowledge and skills up to date.
6. Teacher	Pharmacists have a responsibility to assist in the education and training of future generations of pharmacists and the public.
7. Leader	Pharmacists are obligated to assume a leadership position in the overall welfare of the patient and the community.
8. Researcher	Pharmacist must be able to use the evidence base (e.g., scientific, pharmacy practice, health system) effectively to advise patients on the rational use of medicines as part of the health care team.

Caregiver

Decision maker

Communicator

Researcher

The 8 ⭐ Pharmacist

Manager

Leader

Teacher

Life-long learner

OUR CORE BUSINESS: THE TEACHING AND LEARNING PROCESSES

Pharmacy students need the necessary skills to translate theory and research in basic, medical, and pharmaceutical sciences into practice. In other words, they should possess the ability to connect the pharmaceutical sciences, which form the foundation of the practice of pharmacy, to patient care. To put these into the educational perspective, students need to be able to correlate theory with practice in the cognitive, affective, and psychomotor domains in the patient care setting (Figure 1).
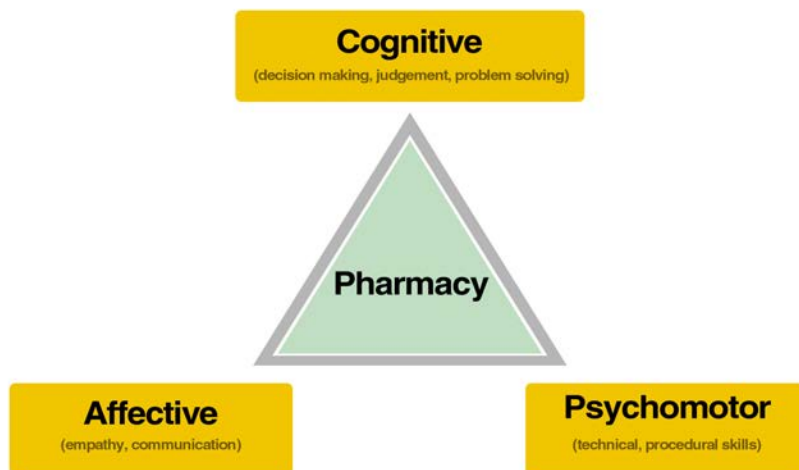
Figure 1: Educational activity domains

The cognitive domain involves knowledge and the development of intellectual skills. This includes the recognition of facts, such as the mechanism of drug actions, side effects of drugs, and special dosage requirements for patients with end-stage renal disease. The affective domain includes how students deal with patients and their feelings, values, appreciation, enthusiasms, motivations, and attitudes. The psychomotor domain involves demonstration and technical aspects of drug use (Bloom, 1956; Clark, 2010).

Although only a few pharmacy faculty members, including myself, have attended formal classes to learn about the principles of teaching and learning, consciously or not, all of these domains of Bloom's educational activities i.e. the cognitive domain in the learning taxonomy (knowledge, comprehension, application, analysis, synthesis, and evaluation) have been incorporated in our curriculum. With these domains in place, the problem for teachers lies in the process of teaching and learning. The obstacles that students face are different. Based on my more than two decades in academia, I have observed that our pharmacy students lack the ability to integrate and apply the knowledge acquired in their academic curriculum to the pharmacy practice setting. They seem to possess an adequate knowledge base (i.e., the cognitive domain), but many of them lack the intellectual process needed to identify the patient's therapeutic problems and synthesise clinical and therapeutic data. However, this ability is essential in

a professional pharmacy practice, where important pharmaceutical and clinical skills are needed to deliver pharmaceutical care to patients. Thus, either our students fail to think or we have not taught them to think like a pharmacist.

Teaching is only effective if it promotes learning. It is assumed that if a person simply knows a lot about their subject, he/she will be able to teach it. In reality, of course, although subject expertise is important, it is not sufficient. This is particularly true in pharmacy, where students have to develop systematic and analytic methods of thinking. Unlike in the classroom, real patients present with a multiplicity of medical and drug use problems. Therefore, we have to develop different instructional strategies or teaching techniques for different domains of learning outcomes (i.e., cognitive, affective, and psychomotor). For instance, when we talk about cognitive strategies, such as developing a treatment plan for a patient with diabetes, a case scenario that requires application of the principles of problem-based learning should be developed for the students to master these skills. In terms of psychomotor skills, such as administering a subcutaneous injection of insulin or using an inhaler or nebulizer to treat an asthmatic patient, a session to practice demonstration skills should be conducted. This should include showing how to draw insulin into the syringe, preparing the injection site, and injecting the dose into a simulated fat pad. Similarly, a placebo inhaler can be used to demonstrate the correct technique of using an inhaler. In such sessions, students repeatedly practice the entire skill to develop a motor memory. In short, our teaching goal should be to foster conceptual learners who care deeply about their patients and who are skilled problem solvers.

TEACHING METHODS THAT PROMOTE THINKING SKILLS

In the conventional lecture approach, the lecturer is the sender or the source, the educational material is the information or message, and the student is the receiver of the information (Figure 2). In other words, the lecturer delivers the lecture content and the students listen to the lecture. The lecturer controls the instructional process, the content is delivered to the entire class, and the lecturer tends to emphasise factual knowledge.

Figure 2: Conventional teaching method – one-way flow of information

Why does this particular lecture format still prevail in higher education institutions? One legitimate reason is that most teachers do not take formal pedagogy courses, thus they continue to teach using the methods that they learned during undergraduate and doctoral programs. Many faculty members believe that the lecture format is an efficient way to provide students with large amounts of information in short amounts of time. In fact, lectures should be used to help students understand theories and ideas, which

they then can apply in the practice setting. Being a practicing pharmacist, he/she should not only rely on memorization of facts and figures but should also be able to integrate and apply the knowledge gain in class to real-life practice. Pharmacy students need to integrate and apply the knowledge gained in class to real-life pharmacy and health care settings. However, if lecturing is the only tool used, and if its only purpose is to deliver facts and information, then student learning may be diminished. For effective teaching and learning, we need to create more opportunities for student engagement, participation, and active learning.

My approach to teaching my pharmacy students is not to simply give them 'a fish' so they can eat for a day; instead, I teach them how 'to fish' so they can eat for a lifetime. In other words, students must be responsible for their own learning, and the 'spoon-feeding' approach is no longer relevant in pharmacy. The following is a description of some of the 'teaching tools' that I have developed to teach pharmacy students to 'think like a pharmacist'.

THE PHARMACY PRACTICE COURSE

The Pharmacy Practice Course (FAR351.3) is a 3 unit course offered in the first semester to third-year pharmacy students. It includes didactic lectures, which introduce the concept of the clinical pharmacy and pharmaceutical care. The practical component of the course emphasises student skill development in the area of medication history taking, patient interview, medication counseling, use of medical devices, communication with doctors, and identification and resolution of drug-related problems. The Objective Structured Clinical Examination (OSCE) is therefore adapted for students to practice these skills.

We successfully developed and applied an OSCE-style practical session in the FAR351 course for the first time during the 2009/2010 academic session. The OSCE was conducted in the Clinical Pharmacy Labs, which were equipped with five counseling rooms designed for this purpose. Each room was furnished with a round table with two chairs. To ensure that there was a real-life scenario and to create a more natural environment, a closed-circuit television (CCTV) system with audio and video recording facilities was used to monitor and evaluate the students' performance in each of the OSCE stations (i.e., rooms). Each station tested different cognitive and practical skills that resemble professional tasks, such as taking the patient's medication history, interpreting lab data, communicating with a doctor, or teaching a patient how to use an inhaler. OSCE stations used 'standardized patients', who were lay people trained to act out the patient encounters accurately and consistently. We also invited five post-graduate students in clinical pharmacy to participate in this practical. All participants (either as a simulated patient or a physician actor) were given prior training to ensure the consistency of their responses.

The mechanics involved in designing and implementing the OSCE-style practical session included:

- Identifying the type of student performance (e.g., observable types of skills, activities, and attitudes) to be measured in order to determine if the learning objectives have been reached. This is a blueprint developed by faculty members that serves as a guideline. The faculty members in this practical consist of one lecturer and three associate professors in clinical pharmacy.

- Defining clinically relevant problems and assignments that resemble the actual professional tasks and for which the observable skills, activities, attitudes can be measured based on the blueprint. The contents of five active stations of the OSCE are determined by carefully defining specific practice competencies in tandem with the course objectives and learning outcomes.

- Designing assessment instruments in the form of structured marking schemes for individual stations (e.g., score list, check list). This is developed based on the tasks assigned at the individual stations. The content of respective given station and its assessment tool is subjected to face validation by all faculty members involved in conducting the practical.

- Producing an inventory of materials needed and making them available during the practical sessions. Examples include: standard case scenarios, patient and physician actors, instructions and guidelines for students and the simulated patients and physicians, medical equipment such as electronic blood pressure devices and peak flow meters, and specialized dosage forms such as insulin pens, inhalers, or nebulizers. Samples of medications prescribed are prepared and labelled.

- Deciding on practical issues, such as: How much time is needed at each station? How many OSCE stations are needed to cover all assignments (try to keep the number of stations low)? How many scorers are needed? Will you observe using one-way screen rooms, closed-circuit video or video recordings, or a sit-in observer? How many practical sessions are needed?

During the 2009/2010 academic session, six groups of third-year students (total enrolment of 170) participated in this OSCE-style practical. An orientation session was given to the students before the OSCE about the flow of the practical and review of commonly assessed competencies. A session consisted of seven stations: five active stations (the counselling rooms), one waiting room, and another station for rest before leaving the clinical pharmacy laboratory. Students moved from one station to the next in a linear fashion. Table 2 provides a summary of the objectives and contents of each station.

Table 2: Objectives and description of the OSCE stations

Station 1: Waiting room
Description: Briefing the students about the OSCE stations

Station 2: Medication history taking
Description: A 56-year-old patient presents a prescription (enalapril 10 mg. qd, hydrochlorothiazide 25 mg. qd) at the pharmacy counter and complains of a cough.
Objective/Task: To evaluate the student's ability to conduct the patient interview to take the patient's medication history
Patients: Trained post-graduate students acting as patients
Requirements: Samples of enalapril and hydrocholothiazide tablets, a prescription

Station 3: Use of electronic blood pressure (BP) monitor
Description: A 56-year-old patient presents a prescription (enalapril 10 mg. qd, hydrochlorothiazide 25 mg. qd) at the pharmacy counter and requests that the pharmacist demonstrate how to use the electronic BP set
Objective/Task: To evaluate the student's ability to explain and demonstrate the correct technique of measuring blood pressure using the digital BP set
Patients: Trained post-graduate students acting as patients
Requirements: Samples of enalapril and hydrocholothiazide tablets, a prescription, an electronic BP set

Station 4: Communication with the prescriber
Description: A 56-year-old patient presents a prescription (enalapril 10 mg. qd, hydrochlorothiazide 25 mg. qd) at the pharmacy counter and complains of a terrible cough after taking enalapril.
Objective/Task: To evaluate the student's ability to give evidence-based recommendations to the physician to resolve the patient's complaint.
Presciber: Trained post-graduate students acting as a doctor.
Requirements: Samples of enalapril and hydrocholothiazide tablets, a prescription

Station 5: Counselling the patient on antihypertensive medications
Description: A 56-year-old patient presents a prescription for
losartan 50 mg. qd (new), hydrochlorothiazide 25 mg. qd (continue), and syrup Benadryl® 10 ml. TiD (new).
Objective/Task: To evaluate the student's ability to counsel a hypertensive patient by applying appropriate counselling techniques
Patients: Trained post-graduate students acting as patients
Requirements: Samples of tablet losartan, tablet hydrocholothiazide, and syrup Benadryl®

Station 6: Drug therapy monitoring
Description: A 56-year-old patient presents a prescription for
losartan 50 mg. qd (new), hydrochlorothiazide 25 mg. qd (continue), and syrup Benadryl® 10 ml. TiD (new).
Objective/Task: To evaluate the student's ability to monitor for drug therapy outcome.
Patients: Trained post-graduate students acting as patients.
Requirements: Samples of tablet losartan, tablet hydrocholothiazide , and syrup Benadryl®

Station 7: Resting station
Description: Students are given a questionnaire to fill out before leaving the clinical pharmacy lab.

A time limit of 5 minutes was allocated for each student to complete the task at each station. The assigned and trained actors assessed the student at the end of each session using a structured and standardized marking scheme. The faculty members re-assessed the students' performance by viewing the CCTV video recording. Table 3 shows a sample of the evaluation form. Because the OSCE component of the Pharmacy Practice Course accounted for 30% of the total grade, a holistic approach was used for grading the overall summative performance of the students in the course. As the OSCE was a pioneering experience at our school, we conducted a cross-sectional survey among the students to identify areas that may need improvement before implementing similar exercises in the future.

Table 3: Sample of the OSCE evaluation form

Student's Name : _____   Date : _____

No	Did the student perform the following activities?	Yes	No
1.	Greet the patient and introduce him/herself		
2	Try to establish a relationship by asking general question about the patient		
3.	For Losartan, did the student apply the Prime Question Technique: What did your doctor tell you the medication is for? How did your doctor tell you to take this medication? What did your doctor tell you to expect from this medication? (should emphasise the possibility of a hypotensive episode on first use)		
4.	For Hydrochlorothiazide, did the student apply the Show & Tell Technique: i. What is this for? ii. How do you take it? iii. What do you expect?		
5	For Syrup Benadryl, did the student apply the Prime Question Technique: What did your doctor tell you the medication is for? How did your doctor tell you to take this medication? What did your doctor tell you to expect from this medication?		
6.	Did the student verify the patient's understanding before ending the counselling session?		
7.	Did the student explain the meanings of the pharmaceutical abbreviations ? (i.e. qd & TiD)		

Table 4 lists the positive and negative aspects of the OSCE-style practical as described by the students. Some of the suggestions to improve the OSCE-style practical are as follows:

- increase the time allocated for each station;
- increase the number of stations;
- in-depth discussion and demonstration of the use of medical devices during the didactic lectures in class;
- more OSCE-like practical sessions throughout the semester;
- discussion with students after the OSCE;
- allow students to watch OSCEs that have been previously video recorded; and
- invite actual patients and doctors instead of actors.

Table 4: Student's comments about the OSCE-style practical

Positive Aspects	Negative Aspects
1. Opportunities to learn about real-life scenarios 2. Built up or improved their communication skills 3. Identified spots of weakness in their skills and knowledge 4. Motivated them to study 5. Chances to learn about the use of medical devices 6. Wide area of knowledge and clinical skills covered during the OSCE	1. The 5 minutes of time is too short to complete the task 2. No practical training about the OSCE 3. Instructions given were not specific and were ambiguous 4. Confusing and stressful method of assessment

Based on the comments and suggestions made by the students, it seems that OSCE can be effectively used as a teaching tool, particularly if feedback is given to highlight areas where students are performing well and those that require further development. A major impediment to the wide implementation of OSCE is that it is a labour-intensive and costly form of assessment. However, the costs of paying for standardized patients can be minimized by using post-graduate students in both teaching and evaluative sessions.

Role playing to teach medication counselling skills in the Outpatient and Counselling Clerkship

Clinical clerkships, whether in a hospital, ambulatory clinic, or community setting, are part of the experiential program designed for both the undergraduate and post-graduate pharmacy students. In general, students in clinical clerkships utilize patient care experiences to integrate and apply information gained from prior didactic coursework. The main goal is to develop and enhance students' understanding, problem-solving skills, and knowledge of the appropriate use of medications.

The Outpatient and Counselling Clerkship is one of the clinical pharmacy clerkships that is designed for fourth-year pharmacy students. For effective student participation in the clerkship activities, students are divided into seven groups (10–12 students per group). They rotate every week for a total of 7 weeks in order to complete all of the clinical pharmacy clerkship activities (Table 5).

Table 5: Outpatient and Counselling Clerkship activities

Day 1 (Monday) – Pharmacy Practice Lab		
Time	**Activity**	**Preceptors**

9:00 am-4:30 pm	Briefing and introduction about the OPD/Counselling clerkship
	Grouping of students into two groups
	Case scenario and role playing
	Group assignment
	    Group 1: 10:00 – 1:00 pm
	    Group 2: 2:15 – 4:30 pm
		Dr. Azmi Sarriff
		Che Gayah Omar*

Days 2 & 3 (Tuesday & Wednesday) Attachment at OPD Pharmacy, Hospital Seberang Jaya			
Time	**Day 2**	**Day 3**	**Preceptors#**
9:00 am-4:30 pm	Each group will be assigned to the respective activity: Group 1 – Prescription management Group 2 – Patient counselling activities	Each group will be assigned to the respective activity: Group 1 – Patient counselling activities Group 2 – Prescription management	Cik Nor Adlina bt. Mokhtar Pn. Tan Siao Yin Cik Eng May Fern
9:00 am-4:30 pm	**Day 4 – Thursday** Activities at the Pharmacy Practice Lab/Mpharm Room Re-play of recorded video for group discussion		Dr. Azmi Sarriff Che Gayah Omar
	Day 5 – Friday Preparation of group assignment report/self study		

* Pharmacist at the Pharmacy Practice Lab
\# Pharmacists at the Outpatient Pharmacy Department, Hospital Seberang Jaya

The main aim of 'mock counselling' is for the students to practice and get the feel of counselling patients under different scenarios. This is not feasible if real patients from the hospital are used; furthermore, students are not allowed to counsel real patients during the clerkship. Instead, students are assigned roles of patients and pharmacists and asked to spontaneously act and interact as if they really were these people. The setting, situation, and time limit are defined, and the students are provided with a description of their roles. The students are required to switch roles during the role-playing session.

On Day 1 of the Outpatient Pharmacy Department (OPD)-counselling clerkship, the morning session encompasses the 'warming-up' process, during which the students get to know each other in a trusting fashion and become involved in the theme that they are supposed to learn. Simply assigning roles by saying to a student, 'You're the patient who is non-compliant,' and to another, 'and you're the pharmacist in charge of the outpatient pharmacy' may lead to problems, as students may feel as if they have been tossed into a pond and told to learn to swim. The facilitators need to brief all of the students about what they need to do and emphasize that cooperation from every student is needed for the role-playing to be successful.

After the warm-up session, each student is assigned a role (patient or pharmacist). Student stay in pairs so that they can take turns playing the pharmacist and then the patient. Each pair takes 10 minutes to plan the approach of both roles, and then they play out their scenarios in the counselling room while being recorded via CCTV. The recorded video is re-played for discussion, and feedback is received from all group members. This activity is carried out on day 4 of the clerkship. Each student is reminded to be comfortable in receiving and giving feedback and constructive criticism about patient counselling skills.

The case scenarios used during role-playing are designed to represent real-world situations and take into consideration real issues that affect patient counselling. These issues may include a patient with a critical illness, his or her belief and feelings about the illness and medication usage, and the cost of therapy. A sample of a case scenario used in the mock counselling is described below.

Description of the case scenario—Mr. TT is a 50-year-old senior executive at a famous advertising company in town. He is very mobile and his schedule is always tight. He has telephoned ahead for a refill of his prescription for Metformin 500 mg, TiD for a 1 month supply. After checking his medication profile, the pharmacist notices that the last time he came in for a refill for his medication was 6 weeks ago, which means that he was not complying with his oral hypoglycemic medicines.

Instructions for playing the pharmacist role—Mr. TT is a 50-year-old senior executive at a famous advertising company in town. He has telephoned ahead for a refill prescription, which is now ready:

Rx: Metformin 500 mg. i tid (100)

His Medication Profile: _____

Rx#	Medication	Supply	Doctor	Last Filled
54110	Cloxacillin 250 mg. QiD	20	Ali	10 weeks
54111	Metformin 500 mg. i tid	100	Ali	6 weeks

Counsel Mr. TT and explore the reasons for his late refill.

Instructions for playing the patient role—

- You are Mr. TT, a 50-year-old patient and a senior executive at a famous advertising company in town.
- You are married with two kids.
- You have been prescribed Metformin 500 mg three times daily for Type II diabetes.
- You ran out of your diabetes medicines 1 week ago but you were busy and did not have time to pick up a refill. You are not worried, as you already have an alternative medicine (i.e., a herbal product that was recommended by a friend).
- Your reasons for the late refill are as follows: Busy work schedule; you believe that your diabetes is not severe; you want to try the herbal product as an alternative, and this product needs to be taken only once

a day; you have been taking Metformin for the past several months but have not noticed any improvement in your diabetes.

On day 4, all students gather to discuss and receive feedback about their role-playing sessions. The student pair is asking for their impression of the exercise. Other students are encouraged to make constructive criticisms and to comment to the role players based on the following aspects:

- Establishes a therapeutic relationship
  - Greeting
  - Establishes rapport
  - Introduces self and purpose of the counselling session

- Gathers information and identifies counselling issues
  - Obtains necessary information from patient
  - Identifies patient problems or concerns
  - Asks appropriate questions
  - Applies appropriate non-verbal techniques (e.g., good eye contact, facial expression)

- Resolves counselling issues and provides information
  - Discusses relevant issues
  - Makes appropriate recommendations
  - Provides accurate information
  - Uses appropriate counselling tools
  - Uses appropriate educational methods

- Ending the counselling session
  - Verifies patient understanding
  - Uses appropriate verbal and non-verbal techniques
  - Discusses follow-up with other health care professionals as needed

- Follow-up counselling
  - Makes appropriate referrals
  - Arranges for other services (e.g., social security department)

BRAD PITT PATIENT
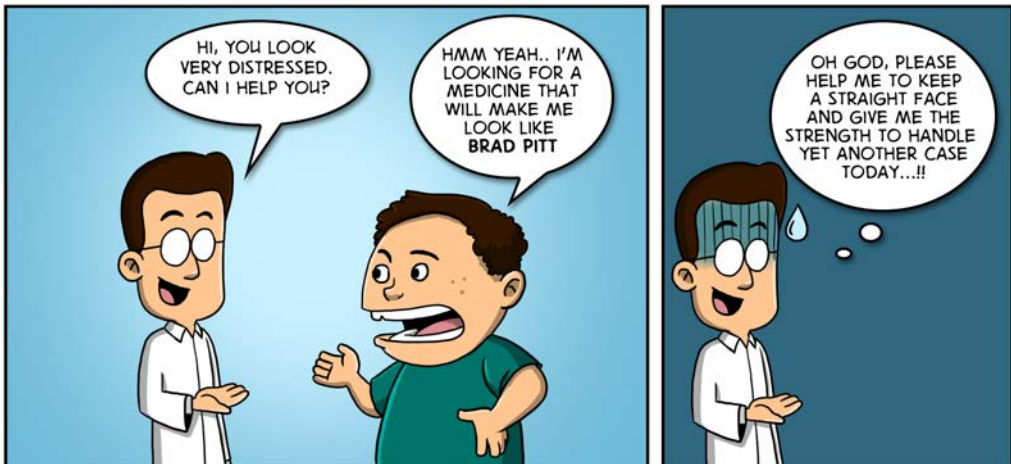
Effective medication counselling requires that a pharmacist have adequate interpersonal communication skills, empathy, and compassion. Role-playing is one of the methods used to develop the skills of interpersonal communication, problem solving, and working cooperatively in teams.

SIMULATED ON-CALL ACTIVITY

In a hospital, pharmacists are 'on call' on a rotational basis. When on call, the pharmacist does not just dispense urgent medicines outside of regular business hours, but he/she also ensures that all members of the health care team and patients have access to information about medicines whenever it is needed. This means that the pharmacist must be available when there are calls, most commonly from the nursing stations, requesting medications for new admissions at odd hours. Thus, the pharmacist on call must have sound personal, time management, and communication skills that function at an accelerated pace. Most importantly, the pharmacist on call has to learn to expect the unexpected.

Although calls requesting a supply of medicines are common, they can prove to be challenging, especially when they are from clinicians. Imagine the on-call pharmacist receiving a call at 3 am asking whether it is okay for a premature baby who is receiving a digoxin infusion to have a digoxin blood concentration of 2.3 mcg/L. The/she would need to refer to reliable drug information resources before responding.

The simulated on-call exercise is intended to expose and orient students to various fields within the patient-centred role of pharmacist. This activity also is intended to familiarise students with the online learning environment. The main aim of this activity is to develop skills in handling drug information requests in a clinical setting. A description of the simulated on call activity is as follows:

- In addition to participating in clinical pharmacy clerkships (as mentioned above), students are scheduled to be on call on a rotational basis. The on-call period starts after office hours (i.e., after 5 pm).
- The on-call activities are divided into two parts: (i) answering calls from the facilitator, who acts as a doctor, nurse, or patient; and (ii) participating in an online discussion via the university's e-learning portal, which utilizes the open source software program, MOODLE, version 1.3 (Modular Object-Oriented Dynamic Learning Environment).
- Using the MOODLE platform, an online forum activity is created by the facilitator (clinical pharmacy lecturers*) for the student to discuss and obtain feedback from other students.

Each student is allowed a time limit of 30 minutes to complete the first activity. He/she has to collect the hand-held phone (provided by the clinical pharmacy for the purpose of this activity) from his/her group leader during office hours and return it the next day after completing the activity. The student who is on call receives calls from the requestor (i.e., facilitator, clinical pharmacy lecturer), and he/she must respond to the requestor's query within the given time frame. Later, the facilitator creates a forum by posting the drug information query in the e-learning portal. The respective student has to respond to the query and discuss it among his/her peers. Other students are urged and encouraged to share and contribute ideas regarding issues related to the posted questions.

The clinical pharmacy lecturer acts as the online facilitator and is responsible for creating a friendly and interactive online atmosphere. The main aim is to facilitate the students' learning process around a particular content. The forum ends when the student has exercised his/her capability in responding to the drug information request as judged by the facilitator. Figure 3 shows an example of the discussion forum. The student is then required to submit a written report based on the discussion that took place during the forum (Figure 4)

Figure 3: MOODLE forum activities (excerpted directly from MOODLE)

Facilitator: *A mother mistakenly gave her baby suppository Paracetamol orally. She was worried if the medication would cause harm to her baby.*

Student *A: Usually it isn't harmful if Paracetamol suppository is taken orally, but the medication will probably not work as well.*

Student *B: I agree with Weng Fong. I suggest that if the baby does not show any symptoms of early features of poisoning like nausea and vomiting, we do not have to worry about it. If the baby shows the symptom(s), consult the doctor immediately.*

Even if the baby lacks significant early symptoms, he/she (the baby) who had taken an overdose of Paracetamol (based on the age and body age of the baby) should be taken to hospital immediately. Reference: British National formulary

Student *C: If the amount of suppository is only 1, then it is considered ok since it will not be harmful to the baby*

Student *D: How about the base of suppository. It is not going to be harmful to the baby?*

Student *A: The bases of suppository usually is cocoa butter, polyethylene glycol, glycerol gelatin or bases produced from vegetable oil. I have checked through the Micromedex. Cocoa butter is non toxic. These agents are not considered to be a toxic hazard in the quantities available through normal exposure or package sizes. For polyethylene glycol, oral toxicity is extremely low. Glycerol gelatin and bases produced from vegetable oil are usually not harmful.*

Student *E: The suppository bases usually fall into two classes; fatty bases-these melt at body temperature, and water miscible/soluble bases-these dissolve or disperse in solution. All in all, the drug will be released once the suppository melts and absorbed via the GIT. Hence, we can expect it will give the comparable therapeutic effect as for the oral product. Our concern here is thus on the possible toxicity of the bases. Theobroma oil is the main ingredient of chocolate meanwhile glycerol is widely used in pharmaceutical products. Thus, we can expect them to be safe for consumption with minimal toxicity if any.*

My recommendation:

1. *Tell her there is practically no harm and there is nothing to worry about.*
2. *Advise her to read the label carefully each time before using any drugs and to strictly follow the doctor's/pharmacist's instruction on drug usage.*
3. *Ask her to call the doctor immediately if there are any suspected toxicity/hypersensitivity reactions i.e. rash, itchiness, swelling, persistent nausea & vomiting, yellow eyes, dark urine.*

Ref:

1. *Cooper and Gunn's Dispensing for Pharmaceutical Student*
2. *Medscape*

Student *F: Suppository is given to baby due to the difficulty of administering medicine orally to the baby. It will be absorbed in the GIT. The bases are our concern now. Since the baby did not show any symptoms, there is nothing to be worried.*

Facilitator: *To student A; from the discussion, what information would u like to give during counselling?*

Student *A: First, I would tell her not to worry as it will not cause harm to her child. If she is still worried about it, I will tell her to observe for any suspected toxicity or hypersensitivity symptoms such as nausea, vomiting, diarrhoea, rash, itchiness or swelling. If the signs and symptoms persist, I will ask her to see the doctor. Then, I will ask her to observe her child for fever because I doubt if the drug would still work. Lastly, I will also advise her to read the label carefully before giving the drug to her child and follow the instructions given by the doctor and pharmacist.*

Facilitator: *Okay*

Student *A: Madam, may I proceed to write the report?*

Facilitator: *Yes*

Figure 4: Sample of drug information report

SCHOOL OF PHARMACEUTICAL SCIENCES
UNIVERSITI SAINS MALAYSIA

DRUG INFORMATION REQUEST FORM

Date: *30.8.2010*   **Time Received**: *8.50pm*

Received by: *Student A*

Requestor's Contact Information

Name: *Pn. Ida*

Contact No: *019-6994735*

Requester's Identity:

☐ Pharmacist   ☐ Physician   ☐ Nurse   ☐ Dentist   ☐ Medical Assistant

☑ Public   ☐ Pharmacist Assistant   ☐ Other (please specify if other):

Request/ Question:

The mother mistakenly gave her baby suppository Paracetamol orally. She was worried if the medication would be harmful to her baby.

Type of Request:

☐ Product Identification   ☐ Dosage/Administration   ☐ Abuse/Addiction   ☑ General Information

☐ Toxicology   ☐ Drug Availability   ☐ Cost   ☐ Adverse Drug Reaction

☐ Kinetics   ☐ Drug Interactions   ☐ Therapeutic Use   ☐ Stability/Compatibility

☐ Manufacturer   ☐ Generic/Trade Name   ☐ Other (Please specify):

Other information required from requestor:

No.

Search Strategy:

Search by internet. Search the bases used in the suppository, check whether the bases used in the suppository will be harmful to the baby or not and whether the bases can be absorbed at the gastrointestinal tract.

Response/Answer:

Tell her not to worry. It would not cause harm to her child. Tell her to observe her child for any suspect toxicity or hypersensitivity such as nausea, vomiting, diarrhea, rash, itchiness or swelling. If the sign and symptoms persist, ask her to take her child to the doctor. Then, ask her to observe her child's body temperature whether the fever gets better or not because I doubt the medication will work as well. Lastly, advise her to read the label carefully before giving any drugs to her child and follow the instructions given by the doctor and pharmacist.

References:

1. Suppository stories. http://www.ismp.org/consumers/Suppository.asp
2. Cocoa butter. Micromedex 1.0 (healthcare series)
3. Polyethylene glycol. Micromedex 1.0 (healthcare series)
4. Suppositories.http://www.pharmpedia.com/Suppositories

Number of callback attempts: ____*1*____ times ....

Date: *30.8.2010*..............   **Time:** *9.17pm*...................   ☐ AM PM

Total Time Required: *27 minutes* ....

Completed By: *Student A*.

Figure 3 shows how the students' learning process is guided during the online forum. Clearly, a student learns when he/she have actively constructed deep understanding through interaction with peers. It is assumed that those students who are slow thinkers can be stimulated and those who are reluctant to engage in face-to-face discussion will participate in the online forum. Therefore, meaningful and active online discussion among students, together with the facilitating roles of the lecturers, will result in effective knowledge sharing and cognitive development. Definitely, additional research is needed to examine the effects of the online learning activity on the overall learning outcomes.

CONCLUSION

To be effective lecturers, teachers need to modify their approach to teaching and move from just providing information to facilitating and guiding their students' learning processes. Students need freedom to learn by themselves. Therefore, rather than providing answers to students' questions, teachers should ask more questions that will guide students to the correct answers. This approach also will help students develop the necessary thought processes to become experts (i.e., pharmacy practitioners).

Learning to 'think like a pharmacist' is very challenging, as students must develop three important skills: problem-solving; communication; and self-awareness. These skills cannot be learned simply by reading books; instead, students must engage in activities such as role-playing and learning through the simulated on-call activity. In short, learning 'to think like a pharmacist' is a process that is closer to learning to swim than to learning to list all drugs classified as antihypertensive agents.

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CHAPTER 4

TEACHING COMMUNICATIONS SKILLS TO PHARMACY STUDENTS

Azmi Sarriff

INTRODUCTION

Effective interpersonal communication is a crucial professional and personal skill for pharmacists, as it is vital to be able to communicate with others. By successfully getting messages across to others, we convey our thoughts and ideas effectively. This is essential in the pharmacy practice, where we have to deal with many different kinds of patients. The primary reasons to communicate with patients are as follows: (i) to gather relevant information to make decisions about drug therapy; (ii) to inform patients about the goals of therapy; and (iii) to educate patients about the drug therapy they are receiving and being instructed to take. Tindall (1994) noted that communication skills in pharmacy are needed to establish an ongoing relationship between the pharmacist and patient, to provide ways to ensure patient's information, and, ultimately, to improve the healthcare of the patient. As expressed by Cipolle (1998), 'Care means communication, quality care means quality communication.'

> 'Care means communication, quality care means quality communication'
> ----------------------------------
> Cipolle (1998)

The practice of pharmaceutical care requires the mastery of a set of skills that includes the ability to communicate with patients and other healthcare professionals. Communication involves several activities and can be described as a system made up of several elements (Figure 1). The intended message is put into words by the sender, who transmits it (through a medium or channel) to the receiver, who must then decode the message to understand the intended message.
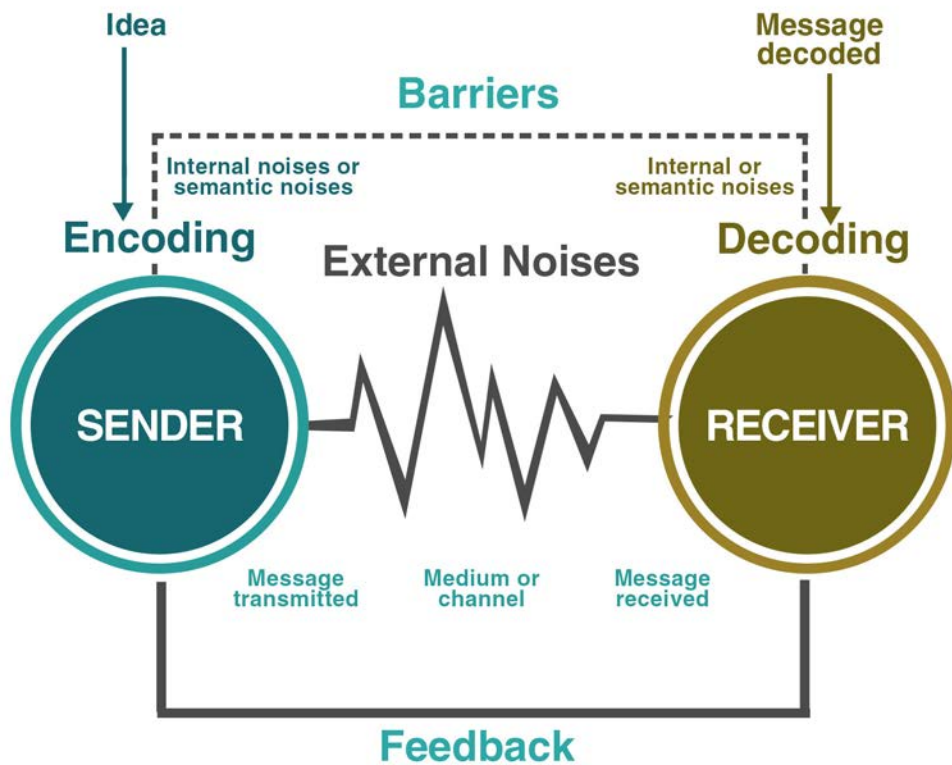
Figure 1: The interpersonal communication model

Along the way, there are several opportunities for communication to fail. Communication breakdown may occur if there are many barriers or noises that distort the smooth transmission of messages. These include: (i) physical or external noises that occur outside the sender and receiver; (ii) physiological noises that are biological in nature, such as the sender having an illness like a cough and cold; (iii) psychological or internal noises that consists of the sender's or receiver's biases, prejudices, and feelings toward a person and message; and (iv) semantic noises that comes from our attributing different meanings to words.

To be an effective communicator and to get our points across without misunderstanding and confusion, our goal should be to lessen the frequency of these barrier or noises at each stage of this process with clear, concise, accurate, and well-planned communications. When communicating with patients and other healthcare professionals, therefore, we should manage how we convey the intended message through verbal and non-verbal communication. In addition, we must be aware of the verbal and non-verbal responses or feedback of the receiver of our communication so that we can identify when confusion or misunderstanding has occurred and take steps to clarify the message.

This chapter describes the implementation of a communication course titled Communication Skills in Pharmacy Practice that is required for first-year pharmacy students. The innovative parts of the course are the introduction of inbound presentation and the communication case scenarios assignment. Basically, this is an improvisation, and   is meant to prepare students for oral presentation without preparation. Each student will be randomly picked and asked to present any topic of his/her choice. In addition, students' communication apprehension (CA) is measured at the beginning and at the end of the course. Communication apprehension (CA) is an "individual level of fear or anxiety associated with either real or anticipated communication with another person or persons" (McCroskey, 1977)

COURSE DESCRIPTION

Communication Skills in Pharmacy Practice was first offered during the 1994–1995 academic year as a required one-unit course for first-year pharmacy students. It was developed in response to pharmacy curriculum revisions that were based upon the growing awareness of the importance of this subject in pharmacy practice. There has been increased emphasis on improving pharmacy students' communication skills. Hence, in response to the World Health Organization (WHO) report titled *Preparing the Pharmacist of the Future: Curricular Development* (WHO, 1997), the course was further reviewed and upgraded into a two-unit course and offered to students during the 2002–2003 academic year. The WHO report introduced the concept of the 'seven-star pharmacist' to define the roles of a pharmacist; the seven stars represent caregiver, decision maker, communicator, manager, lifelong learner, teacher, and leader. Later, 'research' was included as an eighth category, which formed the 'eight star pharmacist' (WHO, 2006). The report stated that as a communicator, a pharmacy graduate must be able to respond to written, verbal, and non-verbal communications from diverse audiences and for varied purposes. Good communication skills are crucial to obtaining these aims.

Primarily, this course provides an understanding of the theories, concepts, and techniques of interpersonal communication among patients, pharmacists, and healthcare professionals. The main aims are to enhance skills and techniques for effective communication in conducting medication counselling, provision of drug information, monitoring of drug therapy, and promotion of pharmaceutical services. After taking the course, the students should be able to:

- describe the concept and model of interpersonal communication;
- outline the technique and approach to answering drug information requests, conducting medication counselling and consultation, and promoting and marketing pharmaceutical services;
- develop the skills to effectively and efficiently apply the techniques of verbal and non-verbal communication; and
- apply the specific communication techniques and approaches in pharmacy practice.

Thus, the course content addresses the importance of communication skills in pharmaceutical care practices; states theories, models, and concepts of interpersonal communication in the context of pharmaceutical care practices; highlights verbal and non-verbal communication; discusses the principles behind providing effective presentations as well as promoting and marketing communications in the

pharmacy; and describes the development of specific techniques and effective communication skills needed in pharmaceutical care practices. The techniques and approaches for effective communication skills that are taught in this course are described below. Marketing communications is a subset of the overall subject area known as marketing. Marketing has a marketing mix which consists of price, place, promotion and product (known as the four P's). In addition to these, people, processes and physical evidence are combined to form the gist of marketing services also known as the seven P's.

Interactive verbal techniques

Traditionally, the emphasis of medication counselling has been on providing information to the patient. The pharmacist is the teacher and the patient is the passive learner. However, in the interactive approach, the pharmacist uses directed, open-ended questions to initiate dialogue to ascertain the patient's understanding of his or her medication.

In this course, the pharmacist-patient consultation technique is introduced to the student. This interactive technique, which was developed by the Indian Health Service (IHS) in the United States three decades ago (Gardner et al. 1991), teaches an interactive method of consultation that seeks to verify what the patient knows about the medication and fills in the gap of knowledge only when needed. Two sets of open-ended questions are used in the consultation. One is for new prescriptions (the prime questions), and the other is for refill prescriptions (the show and tell questions), as shown in Table 1.

Each question probes the patient's knowledge of a specific area of understanding about how to use the medication prescribed. The first question reviews the patient's knowledge about the purpose of the medication. The second question covers all aspect of dosage and administration. The final prime question focuses on expected outcomes and potential side effects. If the patient does not know the answer, the pharmacist should fill in the gap with specific information before proceeding to the next question. The pharmacist should only fill in the gap when necessary so as not to waste the patient's time giving information that he/she already knows. Furthermore, the process allows the pharmacist to personalise each encounter and, most importantly, to ensure that the patient has enough understanding to comply with and use the medication properly.

The prime questions are stated in a way that allows the pharmacist to explore what the doctor has told the patient rather than asking what the patient knows. This can relieve anxiety when the patient does not know the answer. Other open-ended questions may be built around the prime questions to further clarify the patient's understanding. Nevertheless, at a minimum, the three prime questions should be included in every consultation.

Table 1: The IHS Counselling Model

Three prime questions to ask patients who are receiving a new prescription:

    i. What did the doctor tell you the medication is for?

    ii. How did the doctor tell you to take it?

    iii. What did the doctor tell you to expect?

Show and tell strategy when a patient is receiving a refill:

    i. What do you take the medication for?

    ii. How do you take it?

    iii. What kind of problems are you having?

Final verification or asking the patient for feedback
'Just to make sure that I didn't leave anything out, will you go over how you are going to use the medication?'

For patients who come for a refill, show and tell questions are used to verify their understanding about the medications that they have used before. The pharmacist begins the process by showing the medication to the patient, and then the patient tells the pharmacist how he/she uses that medication. The questions are structured differently from the prime questions because the doctor is omitted as a reference. This technique allows the pharmacist to detect problems related to patient's drug taking and drug use.

The last and most important step is the final verification; this is when the pharmacist asks the patient to recall how the medication is to be taken. The pharmacist has to listen to the patient's feedback, correct any misinformation, and add any missing information. The consultation should be closed with an offer of help when questions arise.

The RIM model for counselling noncompliant patients

The issue of patient noncompliance with medication regimens is addressed through the introduction of the RIM model (Gardner et al. 1995). The RIM model is a process that can be used by pharmacists to enhance patient compliance. The model consists of three steps for compliance counselling. The first is RECOGNIZE (R): by using objective and subjective evidence, the pharmacist can determine if the patient has an existing compliance problem. Objective evidence can be obtained by analysing the patients' profile and refill records. For subjective evidence, the pharmacist may talk with the patient in a non-threatening manner and focus on the patient's perception or suggestions that a problem exists. The second step is IDENTIFY (I), which involves determining the causes of noncompliance using supportive

probing questions, empathic responses, and other universal statements. Generally, the pharmacist may categorize the causes of noncompliance as f follows:

1. Knowledge deficits are evidenced through a patient's statements, indicating a misunderstanding or lack of information.
2. Practical impediments or barriers are revealed by a patient's description of difficulty with a complicated dosing schedule or his/her experience with a drug's side effects or adverse reactions.
3. Attitudinal barriers are disclosed by a patient's statement about his/her beliefs about health, disease, and the treatment prescribed.

The last step is MANAGE (M). Once the specific cause is identified, a specific strategy to manage that problem can be implemented.

The knowledge deficit can be resolved by providing both verbal and written information. Using the show and tell technique, the pharmacist may verify whether the patient whether the patient understands what the medication is and how to take it or needs additional information. Practical impediments are dealt with by providing corrective actions that individualised to the problem. Attitudinal issues tend to

RIM Model for Counseling Non compliant Patient

Manage

Recognize

Identify

Knowledge Deficits

Practical Impediments

Attitudinal Barriers
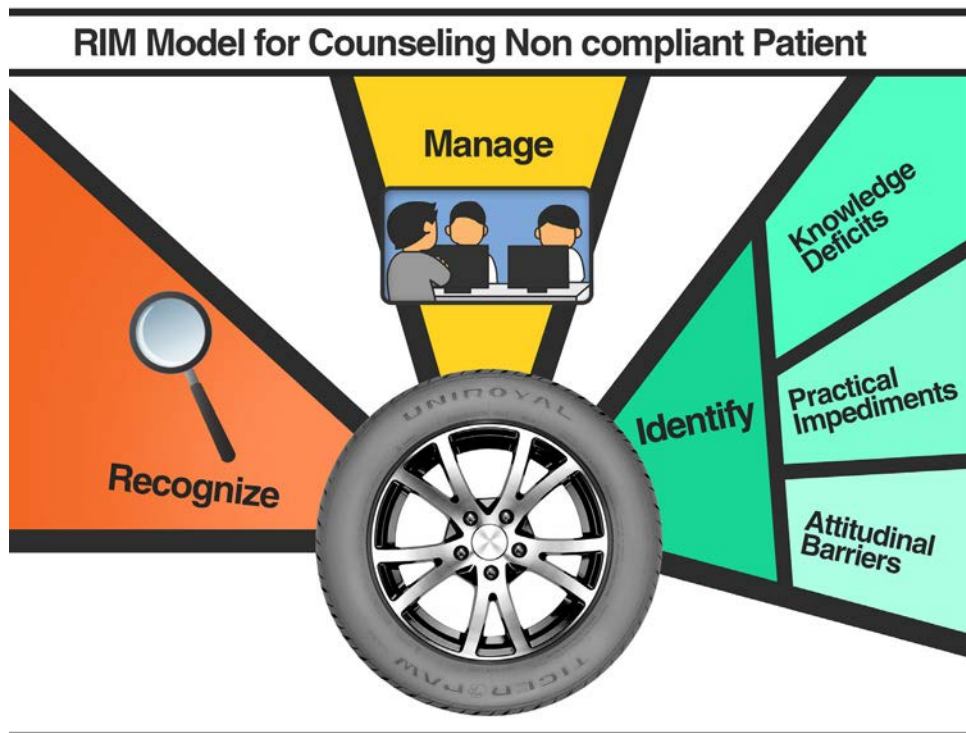
be the most complex and difficult to solve. Nevertheless, they can be rectified by careful listening to the patient's views and using empathy, open-ended questions, and universal statements.

The PAR strategy

The mnemonic PAR, which stands for Prepare, Assess, and Respond, also is introduced to students taking the Communication Skills in Pharmacy Practice course (Gardner et. al., 1993). The first strategy is to be prepared before each counselling session. The aim is primarily to raise awareness about the potential problems, which may include potential barriers to communication, possible compliance problems with the therapy drug, the need for privacy during the counselling session, and the likelihood that increased counselling time will be required. Before each counselling session, the pharmacist may take the following actions to minimize the repercussions of a challenging situation. At the preparation stage, the pharmacist may need to review:

- the prescription information, including the patient's name, the prescribed medication, the dosing schedule, and whether the prescription is new or a refill. A new prescription prompts the use of the prime question approach, whereas a refill indicates that the show and tell technique should be used;
- the patient's profile to obtain information about the patient's name, age, gender, medical history, medication history, allergies, current medical problems, and any notes on noncompliance;
- any personal knowledge about the patient; and
- the state of the pharmacy and the number of patients who are waiting, as well as how you are feeling.

Once properly prepared for counselling, the assessing phase of PAR should begin as soon as a patient is identified. At this point, the pharmacist looks and listens carefully for barriers to communication. This step is very similar to how children learn to look and listen carefully before crossing a busy street. In this context, there are two basic types of communication barriers: (i) patient-related, which can be broken down into emotional (e.g., feelings of anger, embarrassment, or sadness) and functional (i.e., those related to a patient's ability to understand the material communicated by the pharmacist, which include dementia, hearing or vision impairment, or differing health beliefs) and (ii) pharmacy environment barriers, including those that arise from within the pharmacist.

In practice settings, a patient should be assessed the moment he/she enters the pharmacy, and assessment should continue as the pharmacist introduces his/herself. The pharmacist should keep looking and listening for barriers as he/she asks the prime questions or goes through the show and tell technique. The next step is to proceed to the third phase of PAR: Respond appropriately to eliminate or at least minimize the barriers to communication. Then, a new concept called reflective responses is introduced to students. In short, responding primarily is divided into (i) What to say?; (ii) What to do?;

and (iii) What shouldn't be done? during counselling. The differences and similarities between reflective responses, empathizing, active listening, and paraphrasing are presented and discussed in the course.

COURSE FORMAT AND ACTIVITIES

To accomplish the course objectives and achieve the learning outcomes, students engage in the following activities:

- face-to-face contact (via lectures to deliver the content);
- quizzes;
- inbound oral presentation;
- communication apprehension survey (pre and post);
- course evaluation survey;
- role playing of the communication case scenarios; and
- final examination.

It should be noted that knowing how to communicate and being an effective communicator are two different things. It is important to understand how to communicate in order to be an effective communicator, just as we need to understand the rules of swimming before we can swim. It is important to know all the rules, but without applying them the lessons learned may not be helpful. Likewise, we can teach students all of the elements of interpersonal communication by using multimedia technology, but it may not necessarily transmit the intended message. Thus, in this course we expect the students to appreciate the model of interpersonal communication and the communication techniques described above, and, most importantly, we expect them to be able to apply all of the elements of communication in the pharmacy practice.

The inbound oral presentation and role playing of the case scenarios are included in the course to encourage students to engage with the materials taught and practice the skills and techniques that are introduced to foster effective communication. An introductory session is devoted to explaining the structure of the inbound oral presentation and its relevance to the course. Students also are required to fill out the Personal Report of Communication Apprehension (PRCA-24) questionnaire, which is collected at the end of the first class session (see Appendix 1). The inbound oral presentation commences in the third week of the semester. This provides enough time for us to calculate the PRCA score. For the inbound presentation, students are called at random, either prior to or at the end of the lecture, to
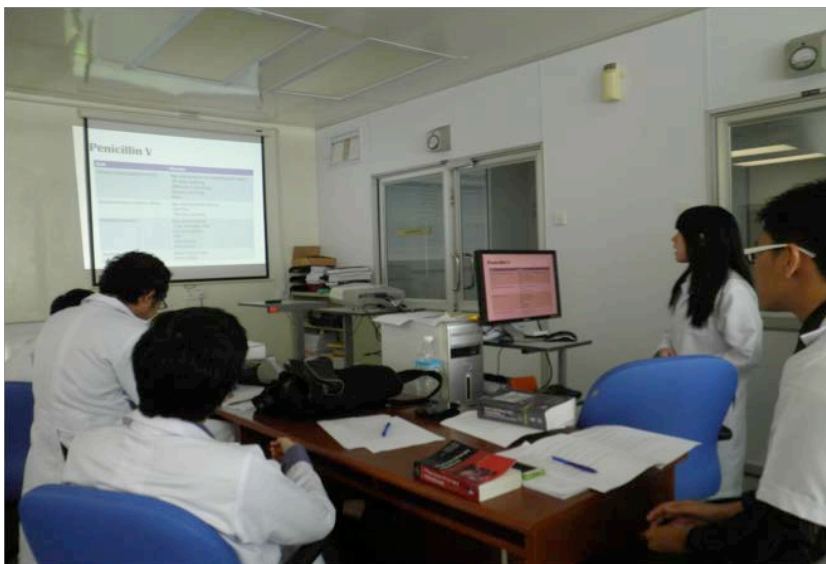
give a 3 minute presentation. He/she may choose any topic for his/her presentation, but most students talk about reasons for choosing pharmacy as a career. The activity continues until all students have the chance to present. An evaluation form is specifically designed for this activity (Table 2).

Table 2: Evaluation form for an inbound oral presentation

Student name: _____   Gender: M/F   Race: M/C/I/

Baseline PRCA Score: _____

Score

Undefined		Inapt to adequate		Appropriate	Appreciative	Excellent
0	4	5	7	8	9	10

Characteristic	Score
1. Student dress during presentation	
2. Student presentation style	
3. Opening statement	
4. State purpose and goal of presentation	
5. Eye contact	
6. Body language towards audience	
7. Vocal tone of student during introduction	
8. Body posture during explanation	
9. Student understanding of title and subcontents	
10. Use of output stimulus (hands and body movements)	
11. Time usage in explanation	

12. Audience response to presenter	
13. Inclusive use of personal experience/opinions/ideas	
14. Increased use of communication skills	
15. Presentation ending statement	

The communication case scenarios, in the form of dialogue scripts, are used as a teaching tool for students to learn the communication techniques and skills described previously. Fifteen communication cases have been prepared to portray realistic examples of interpersonal encounters in pharmacy practice (Table 3). Instructions for the role-playing assignment are as follows:

1. Each group consisting of 6–7 students will be given a case scenario related to pharmacist-patient encounters at the community or hospital pharmacy setting.

2. The case scenario is designed to portray interpersonal communication through a dialogue between pharmacists and their customers, patients, or physicians.

3. Each member of the group is expected to participate and analyse the case with respect to the following:

   a. Understanding the case scenario (i.e., the communication issues related to the case).

   b. Determining the significance of the unspoken thoughts and assumptions (*the unspoken thoughts are italicized and set off by brackets*).

   c. Analyse the scripts for any barriers that impede effective communication.

   d. Suggest an alternative way of handling such scenarios (i.e., how could this have been handled differently?).

      i. What is/are the communication issue(s)?

      ii. What is/are the tools available at the pharmacy to address the issue(s)? (e.g., need for privacy, information materials, etc.)

      iii. What is/are the communication technique(s) that is/are appropriate to address the issue(s) ?

4. Each group is required to do the following:

   a. Prepare and submit one (1) report in the form of written report (may include PowerPoint and/or a video clip). Preparation of report must follow these rules.

      i. The report must be written in concise English.

      ii. The report must be typed on one side of the paper, be double spaced, and have ample margins of at least 2.5 cm (1 inch).

      iii. The report should have appropriate headings and subheadings to include an Introduction, main text (case scenario), the alternative dialogue script (as proposed by the group), discussion, summary, and references.

   b. Present a 20–30 minute presentation which includes a 10 minute question and answer period. The group is responsible for assigning members to give the presentation.

5. The written report is evaluated based on the clarity, creativity, content coverage, and source of references (primary, secondary, tertiary).

6. The oral presentation is evaluated based on the group dynamic/team work, organisation of the presentation, use of media, performed in a professional manner (appropriate verbal and non-verbal skills, impression of confidence, and absence of obvious anxiety).

Table 3: Communication case scenarios

No.	Case scenarios
1	Mother with a sick and crying infant
2	Mother with a child with epilepsy
3	An overweight hypertensive patient
4	Pharmacist on night duty
5	Doctor misunderstanding about pharmacist delivering drug information to patient
6	Pregnant woman picking up an over-the-counter drug from the pharmacy aisle
7	Patient asking for a strong pain killer medication
8	Angry doctor who prescribes a high dose of gentamicin
9	Patient on lovastatin complaining of muscle pain
10	Kid on an inhaler
11	Busy executive late for meeting
12	Patient confused about a generic drug
13	A demented elderly Elderly woman on chronic medication
14	Mother complaining that her child is not responding to an antibiotic
15	Late for refill

COURSE ASSESSMENT

The PRCA score

To determine a student's levels of CA, all students are asked to fill out the PRCA questionnaire. The 24-items PRCA measures students' feeling about oral communication across a broad range of interactions, including group discussions, meetings, interpersonal communication, and public speaking (see Appendix 1). The reliability of this survey instrument in this cohort of students (all students who enrol in this course) was 0.76.

The overall PRCA scores vary from 24 to 120. The level of CA is categorized into (i) low (scores < 51); (ii) average (51–80); and (iii) high (> 80). After students' complete the questionnaire, the results are categorized into five contexts: overall scores and sub-scores of CA for the four contexts of CA.

Because there is no established national norm score for our students, the PRCA scores are compared to the CA norm scores established by Richmond and McCroskey (1998). These norm scores were based on over 40,000 college students and over 3,000 non-student adults in a national sample (52 colleges of pharmacy in United States of America).

Table 4 shows the overall and the sub-scores of the observed PRCA in pharmacy students compared to the norms reported in Richmond and McCroskey (1998). A statistically significant difference was detected between the pre- and post-overall PRCA scores for the pharmacy students. The mean scores for each of the four contexts for CA were high compared to the norm score, except in the specific context of public speaking. However, the students were less apprehensive in the context of interpersonal communication, and the finding was significant ($p < 0.05$). Overall, the levels of CA observed were categorized as low in about 3.4% of the students, medium in 73.1% of the students, and high in 23.5% of the students.

Table 4: The PRCA scores

No.	Communication context	Pre-course scores (mean ± SD)	PRCA norm scores* (mean ± SD)	Post-course scores (mean ± SD)
1.	Overall PRCA score[≠]	71.27 ± 12.26	65.6 ± 15.3	67.82 ± 11.99
2.	Group discussion[f]	17.27 ± 4.49	15.4 ± 4.8	16.60±4.48
3.	Meetings[q]	18.03 ± 4.06	16.4± 4.8	17.24±3.83
4.	Interpersonal[r]	17.60 ± 3.73	14.5± 4.2	16.38±3.41
5.	Public speaking[p]	18.36 ± 3.58	19.3 ± 5.1	17.60±3.52

∗ Norm scores reported in Richmond and McCroskey (1998)
≠ Paired samples t-test statistic between pre and post-course; p = 0.03
φ Paired samples t-test statistic between pre and post-course; p = 0.227
θ Paired samples t-test statistic between pre and post-course; p = 0.110
ρ Paired samples t-test statistic between pre and post-course; p = 0.010

π Paired samples T-test statistic between pre and post-course; p = 0.082

Appendix 1: Personal report of communication apprehension

The PRCA-24 is the instrument that is most widely used to measure communication apprehension. This instrument is composed of 24 statements concerning feelings about communicating with others. Please indicate the degree to which each statement applies to you by marking whether you:

Strongly Disagree = 1; Disagree = 2; Neutral = 3; Agree = 4; Strongly Agree = 5

No.	Statement	Score
1	I dislike participating in group discussions.	
2	Generally, I am comfortable while participating in group discussions.	
3	I am tense and nervous while participating in group discussions.	
4	I like to get involved in group discussions.	
5	Engaging in a group discussion with new people makes me tense and nervous.	
6	I am calm and relaxed while participating in group discussions.	
7	Generally, I am nervous when I have to participate in a meeting.	
8	Usually, I am comfortable when I have to participate in a meeting.	
9	I am very calm and relaxed when I am called upon to express an opinion at a meeting.	
10	I am afraid to express myself at meetings.	
11	Communicating at meetings usually makes me uncomfortable.	
12	I am very relaxed when answering questions at a meeting.	
13	While participating in a conversation with a new acquaintance, I feel very nervous.	
14	I have no fear of speaking up in conversations.	
15	Ordinarily I am very tense and nervous in conversations.	
16	Ordinarily I am very calm and relaxed in conversations.	
17	While conversing with a new acquaintance, I feel very relaxed.	
18	I'm afraid to speak up in conversations.	
19	I have no fear of giving a speech.	
20	Certain parts of my body feel very tense and rigid while giving a speech.	
21	I feel relaxed while giving a speech.	
22	My thoughts become confused and jumbled when I am giving a speech.	
23	I face the prospect of giving a speech with confidence.	
24	While giving a speech, I get so nervous I forget facts I really know.	

SCORING:

Group discussion: 18 – (scores for items 2, 4, & 6) + (scores for items 1, 3, & 5)

Meetings: 18 – (scores for items 8, 9, & 12) + (scores for items 7, 10, & 11)

Interpersonal: 18 – (scores for items 14, 16, & 17) + (scores for items 13, 15, & 18)

Public Speaking: 18 – (scores for items 19, 21, & 23) + (scores for items 20, 22, & 24)

To obtain the total score for the PRCA, simply sum all of the subscores.

The inbound oral presentation

Student feedback about this activity is mixed. Although most students surveyed gave favourable and positive responses, some comments require considerable attention from the lecturer. Examples of some of the unfavourable remarks made by students include:

- I feel tension and stress in class.
- I'm always nervous when you ask questions….I usually do not talk too much….I rather keep everything to myself.
- I'm so scared when I enter this class. Most of what I have learned disappears because I feel so nervous. I have no confidence to talk when you keep asking us questions.
- I don't like the idea of inbound presentation….really stressful.
- This is the scariest class ever!
- I like the way you teach but not the way you ask people for inbound presentation.
- Your class is so stressful. Sometimes I feel like skipping your classes.
- I like this class because it teaches me something that I can use in the future. But every time I attend this class, my heart beat increases and I get tense and nervous the night before class.

"I like this class because it teaches me something that I can use in the future. But every time I attend this class, my heart beat increases and I get tense and nervous the night before class"

Role-playing of the case scenarios

In the comments section of the evaluation form, students have remarked that the role-playing exercises are an enjoyable way to learn something that can be applied in future practices. One group's case discussion is reproduced here to portray the students' learning experiences and their creativity in solving the communication problems.

The case scenario

Mr. Ali is a 54-year old overweight man who has had hypertension for 20 years. The pharmacist, Siti, has known him for 10 years. Mr. Ali comes to the pharmacy for a refill of his antihypertensive

medication and has some concerns about his weight.

Ali: (*sounds frustrated*) You know, Siti, my doctor keeps on insisting that I watch my weight, but I just can't seem to do it.

Siti: (*sounding empathetic*) I know how you feel; it's a very tough thing to do. It requires a great deal of patience.

Ali: (*sounds exasperated*) You know, these pills trouble me a lot. I think they cause the weight gain.

Siti: (*express confidently*) No, I don't think so. Have you tried exercising or trying some natural herbal diet pills?

Ali: (*sounds discouraged*) Well, I wonder if I should find a new doctor who's more up-to-date and willing to help me.

Siti: (*continues to give advice*) I'm not sure about that but I would say that you have to change your diet and lifestyle. That is the only solution for you.

Ali: (*sounds discouraged*) Thanks a lot for your advice.

What is/are the communication issue(s)?

In this case, Siti is faced with her regular patient whom she has known for 10 years. Ali starts the conversation by revealing that he is unable to maintain his body weight. Looking tensed, Ali is frustrated and has some doubts about the cause of his weight gain. He feels more emotionally distressed when being frequently told by his physician to keep a watchful eye on his weight. Initially, the pharmacist, Siti, tries to calm Ali down by showing a positive empathetic response, saying that she understands how her patient feels. However, the patient perceives this response to be just an evaluative understanding from Siti. The problem arises when Ali becomes annoyed and shows impatience after Siti suggests that maintaining an ideal weight requires an enormous amount of courage. Ali may have misinterpreted it as a judgmental response from Siti. Ali tends to attribute the cause of his weight gain to the antihypertensive pills that he has been taking. Siti worsened the situation further by promptly disagreeing with her patient's claim. Siti persisted in probing the source of Ali's weight problem by asking whether he tried exercising or consuming natural herbal diet pills. Sounding discouraged, Ali shifted the topic by expressing his disappointment over his doctor, who he feels is not informed enough and does not show enough care about his health condition. Once again, Siti responded negatively by arguing with her patient regarding his weight gain problem. Siti even suggested that Ali should alter his diet and lifestyle. Sensing a lack of understanding, the patient then ends the conversation by reluctantly thanking the pharmacist.

What is/are the tools available at the pharmacy to address the issue(s)?

Pamphlets: In this case, Ali thought that the antihypertensive drug may have had some side effects, like causing weight gain. Pamphlets would be useful for providing Ali with information regarding the various types of antihypertensive drugs as they contain information about the types of antihypertensive drugs & the common side-effects attributed to each drug. Among the side-effects, some drugs may

cause increase in body weight. Example: The calcium channel blockers may cause edema in the extremities which may lead to increase in body weight Pamphlets can also keep the patients occupied when the pharmacist is unavailable. Undoubtedly, some patients are more convinced by printed materials than information provided verbally by a pharmacist. Moreover, some patients are too shy to seek for consultation when they have enquiries about health issues, especially when they feel that their medical issues are too sensitive or confidential to share.

Private space: It is useful to provide a space for the patient to discuss private and sensitive medical issues. Such a space can also serve as a comfort zone in the pharmacy. A chair or a couch can be prepared for the patient, and the pharmacist then is able to sit down and discuss the patient's issue. Patients will be less tense and less emotional in a comfort zone. Hence, this approach may reduce the occurrence of conflicts in the pharmacy.

What is/are the appropriate communication technique(s) to address the issue(s)?

Opening of conversation: When Ali enters the pharmacy, Siti should first walk out from the dispensing counter to welcome him and greet him politely with a nice smile to show her friendliness to him, even though they have known each other for 10 years.

Non-verbal communication technique: Non-verbal communication skills, such as gestures, are very important when communicating with a patient. Besides maintaining appropriate space and distance, Siti should maintain eye contact throughout the conversation. Siti should also show a smile to establish a working rapport with Ali. This is because a good smile makes the smiling person and the other person feel good.

Body posture is another non-verbal communication technique that promotes a good conservation. Good posture is often associated with strength, confidence, and power. For instance, Siti should maintain an appropriate posture and confidently transmit her knowledge to Mr. Ali to convince and reassure him that weight gain is not a side effect of taking the antihypertensive drug.

Listening technique: Siti should practice active listening skills when communicating with Ali. She should pay attention to Ali's feelings and issues raised by him, and she should look at him and use verbal and nonverbal encouragers. Active listening allows Siti to hear the words and understand the meaning behind the words. During the listening process, Siti can ask more open-ended question to show that she is listening so as to gather additional information. Throughout the conversation, Siti should reflect Ali's feelings and clarify any misunderstanding and move toward problem solving.

Explaining technique: To explain the medicine to a patient, the process involves planning, presentation, and feedback. Thus, it is imperative that Siti structure the explanation and present it with appropriate verbal and nonverbal communication.

Questioning technique: Siti should have a good questioning technique to seek more information from Ali and recognize the problems he faces. In this case, Siti has to know all of the medications that Ali is currently taking so that appropriate corrective action can be employed. Siti should apply the funnelling technique, which means she should start by asking a very open-ended question and then zoom in with more specific and targeted types of questions. Throughout the questioning process, Siti

may alternately used open- and closed-ended questions to explore Ali's unresolved concerns about his weight.

Emphatic responding: It is important to listen to the patient's problem and also look for untold problems or feelings and respond with empathy. This would allow Siti to gather accurate and objective data about Ali's thoughts and feelings. Moreover, Siti should observe and pay attention to Ali's non-verbal communication, such as his facial expression, and she should show her understanding by nodding her head and smiling.

Simple and understandable language: Simple and understandable language is very important when communicating with patients. Siti should avoid using scientific terms or confusing medical jargon, which could cause unnecessary confusion in Ali. Instead, she should use layman terms when explaining the disease and medication to Ali. Moreover, Siti should show the pamphlets to Ali to help him better understand.\

The alternative script dialogue (as proposed by the group)

Mr. Ali is a 54-year old overweight man who has had hypertension for 20 years. The pharmacist, Siti, has known him for 10 years. Mr. Ali comes to the pharmacy for a refill of his antihypertensive medication and has some concerns about his weight.

Siti: *(walks out from the dispensing counter and greets him with a smile after recognizing her regular customer; Ali is approaching with quick and heavy footsteps).* Hi there, Ali! How are you? It seems like you are thinking of something. May I help you?

Ali: *(sounds frustrated)* You know, Siti, my doctor keeps on insisting that I watch my weight but I just can't seem to do it.

Siti: *(pointing at her room)* Here, let us have a talk in this room. It will only take 5–10 minutes. I'm sure we can think of something to help with your problem.

Ali: Okay

Siti: *(sounding empathetic)* Ali, I know how distressed you feel; losing weight is never an easy task as it requires enormous courage and effort. It takes a great deal of patience, as long-term commitment is needed to achieve an ideal weight.

Ali: Sigh!

Siti: However, there are cases where patients like you have succeeded in doing so. If others manage to do so, I believe that you could do the same too, right?

Ali: *(after some deep thought)* Hmmm, I suppose you are right... *(sounds worried)* But, I just seem to have problems with my pills. These pills are troubling me and I have a feeling that these pills make me put on weight, what do you think, Siti?

Siti: *(offering a few pamphlets taken from a nearby table)* Here, Ali, these are a few hypertension-related pamphlets that may be useful for you. As you see, there is no proven evidence that shows that antihypertensive drugs will lead to weight gain. And the pills that you are taking

are included in this list as well.

Siti: (*while Ali flips through the pamphlet*) So, rest assured that your pills are safe. However, maintaining a lower body weight is beneficial in the long run for stabilizing the hypertension condition that you are facing.

Ali: (*nods and sounds convinced*) But then, I'm rather curious on how our body weight actually influences my blood pressure?

Siti: (*smiles and explains*) Well, you see, we gain weight as we take in food rich in carbohydrates and fats. These are high energy food sources, and when broken down they produce globules that are likely to be deposited in our blood capillaries. This will reduce the size of our blood vessels and a higher blood pressure has to be produced to restore normal blood circulatory functions, leading to hypertension. In order to avoid this, shedding a few pounds is a healthy option. In fact, you can try exercising on a more regular basis.

Ali: (*seems to understand better*) Oo.., now I have a clearer picture on that. But exercising is tough for me, and to give up on food that I favour is another challenge.

Siti: (*confidently addressed the issue*) OK, let's put it this way, exercising does not mean that you have to be on the jogging track every day. In fact, taking a 30 minute stroll at the park or along the beach nearby your house should do the trick. Or maybe you can walk instead of drive when you wish to visit nearby shops. By the way, you may not need to eliminate the delicious foods you love to maintain a healthy diet. Instead, try eating them less frequently and in smaller portions. You can always eat a few fresh carrot sticks whenever you feel like crunching on snacks or biscuits that are rich in lipids and carbohydrates. Dark chocolate is a healthy substitute for sweets that you can indulge in, but sparingly.

Ali: (*sounds convinced and encouraged*) I didn't know that putting off weight can be that easy and still enjoyable. This is awesome! I shall start trying these at home.

Siti: (*after jotting down on a clean piece of paper*) Here are some weight loss methods I mentioned earlier to which you can refer. Besides, some natural herbal diet pills may also be helpful for you, such as those listed in this pamphlet. Has your doctor recommended any pill to you?

Ali: (*sounds disappointed*) Yeah, that's the problem! My doctor doesn't seem to recommend further solutions, he just keep insisting me that I should watch my weight. I wonder if I should find another doctor.

Siti: No. no, it is not necessary. Perhaps he was a bit busy on the day of your visit. Anyway, you should stick to the same doctor so that he is able to keep track on the progress of your health. You may want to address your concerns next time you consult him. I'm sure he will be willing to help you out.

Ali: (*smiles, sounds encouraged and shows signs of relief*) That is so kind of you, Siti. Your advice has broadened my mind. Now I realize that a wide range of solutions are available for me and I am confident that my weight problem will improve just by taking simple steps. Thank you so much!

Siti: *(smiles in return, show encouragement)* You're most welcome, Ali. It's my pleasure to be able to serve you and to see you smiling again. I can't wait to see your health improvements the next time you visit me.

PHARMACY

Summary

In a nutshell, by exploring a wide variety of communication skills and techniques, pharmacists likely will be able to solve any communication issues that arise. Barriers and noises that interfere with effective communication are always present in many forms. Therefore, the use of correct tools and approaches might be the solution to the problem.

DISCUSSION

This chapter described the development of a teaching approach that is being used to teach communication skills to pharmacy students. The inbound oral presentation activity provides students with the opportunity to learn how to create an effective presentation. Although students have mixed reactions to this activity, most indicate that it offers ideas for making their next presentation more effective and interactive. The effectiveness of this technique is evident in the differences in the pre- and post-PRCA scores. However, an in-depth study is needed to evaluate the impact of the inbound presentation on students' presentation skills.

The role-playing exercise in the form of dialogue scripts is learning experience both students and lecturers. The dialogue scripts teach students how to handle routine patient counselling and professional communication situations. For example, students can learn and practice how to respond to an angry physician (case #8) or a demented elderly patient (case #13). The expectation of student performance

during role playing is likely to depend on the purpose for which the scripts are being used. The alternative dialogue scripts created by students either are used for the purpose of achieving the course objectives or as a measure of competency of specific skills. To accomplish the course objectives, the created scripted dialogue should contain elements of effective communication. When used to evaluate competency, faculty members need to clearly specify acceptable and unacceptable scripted behaviours. For instance, for students who counsel patients on refill prescription, the script should clearly state the show and tell questions to be judged competent.

Despite the introduction of new approaches to teaching communication skills to pharmacy students, 23.5% of students were classified as having high CA. These findings have implications for both pharmacy education and the profession. If left unattended, students with high CA could become tomorrow's pharmacists with severe CA, which would pose a problem for the profession. Because new roles for pharmacists lean heavily on both communication ability and desire to communicate, having one out of four or five students with high CA going into practice is not in the best interest of the profession.

Certainly, pharmacy students need to acquire appropriate communication skills before practicing. Within the contexts of the communication process, it is important to keep in mind that CA and communication skills are quite different. The former is cognitive, whereas the latter is behavioural. Because CA is cognitive, communication skills courses will not help students with high CA. Unless the apprehension is resolved, increasing the number of student tasks that require communication skills (e.g., oral presentations in the classroom) can make the high apprehensiveness problem worse. However, this does not mean that communication courses are not useful in building a better understanding of communication or improving the communication skills of students.

As pharmacy educators, we need to be aware that the level of student anxiety towards oral communication may be an obstacle to improving the related skills and may require different teaching approaches. The possibility of CA among students should be taken into consideration when creating course syllabi, preparing classes, and facilitating classroom activities. Perhaps the most important thing is to be sensitive to the problem. Thus, acknowledging the existence of students with CA is the first step. This can be done using the PRCA. The next step is to employ techniques in the classroom setting that will reduce or alleviate the anxiety of the high CA student before or during the communication skills course.

In conclusion, effective communication is a powerful skill that pharmacy students need to acquire and master in order to be successful in pharmaceutical care practice. Pharmacy lecturers can use dialogue scripts as a teaching tool to ensure that students learn and develop communication skills to help them fulfil their roles in practice settings.

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CHAPTER 5

TEACHING FROM THE HEART

Fauziah Md. Taib

> "Good teaching cannot be reduced to technique; good teaching comes from the identity and integrity of the teacher"
>
> **Parker J. Palmer**

INTRODUCTION

Teaching is the act of passing knowledge to someone or to a group of students. For teaching to be effective, the process of knowledge acquisition must be enjoyed by both parties (i.e., the teacher and the students). Many people regard teaching as a simple and easy task that involves talking and lecturing. However, those who have experienced the task of teaching know that maintaining students' focus during the delivery of information is an arduous job.

TEACHING AND ATTENTION SPAN

Anecdotal evidence suggests that students' attention span has been decreasing or deteriorating over the last 30 years. The average attention span of an average listener was about 30 minutes 30 years ago (Anonymous, 2010a), whereas today it is only 5–10 minutes (Anonymous, 2010b) for a single unbroken subject. Television and films have always been blamed for this decrease in attention span. Since childhood, students have been exposed to many hours of television programmes, which are broken down into several segments that EACH last ~12 minutes. Thus, indirectly they are trained to remain focused for

that length of time. The challenge for any teacher or lecturer is to pass on knowledge to students while retaining their focus.

Effective learning can only occur with the mutual cooperation of teachers and students. Many of the problems with learning occur when both parties are physically present but spiritually absent. The teacher may treat the learning session as just another task that needs to be completed, and the students may merely go through the motions without interest. This is where the big vacuum exists, and it is the main recipe for failed teaching and learning.

SCIENTIFIC FINDINGS ABOUT THE HEART, BRAIN AND TEACHING-LEARNING

Findings from a new discipline called neurocardiology suggest that the heart has a complex, intrinsic, and very complicated nervous system that is capable of functioning independently from the brain's nervous system to learn, memorise, feel, and sense. The heart's nervous system contains 40,000 neurons that send signals that influence perception, decision making, and cognitive processes. More information is sent from the heart to the brain than vice versa.

The heart has an electrical field that generates ~60 times more electrical activity than that generated by the brain (Armour, 1991). The heart's magnetic field is not only 5,000 times stronger than that of the brain, but its effect can be detected with a magnetometer up to 10 feet from the body (Armour, 1991). Because a strong magnetic field emanates from the heart to the brain, it is likely to produce a strong effect on the brain's function and could enhance a person's feeling of well being. Energy from the heart can also travel in other energy forms. The normal reading for brain activity is between 0 to 100 cycles per second (CPS), whereas it is 250 CPS for the heart. This finding confirms that the heart is the body's strongest energy messenger and receiver (Essene, 2005). The existence of this energy from the heart has enabled spiritual healing or learning to occur especially when the human energetic field interacts and exchanges.

The implications of these findings for teaching and learning are extensive. First, in any learning session, the hearts of both interacting parties have to be present and be fully motivated. The lecturer in charge has to ensure that his or her heart is fully energised (motivated) before starting the session, as the positive (negative) charge carried by his/her heart should enable effective (failed) learning to occur as his/her and the students' hearts interact. The knowledge to be passed on that comes from a sincere, hopeful, and motivating heart to another heart will have a better impact (learning outcome) than when these conditions are not met. To allow for a better exchange of energy, the lecturer should not stand too far away from the students. Thus, class size ideally should be kept to a minimum. Alternatively, the lecturer should try to move around the classroom so that the magnetic field from his or her heart can be felt and shared by all of the students.

> The sheer dedication and full motivating energy of the lecturer will have a positive impact on the learning experience of the students

TEACHING PHILOSOPHY

Teaching from the heart involves more than just the energy in the heart. It also refers to the dedication and motivation that the lecturer has and his/her tireless effort to pass on knowledge to the students. The sheer dedication and full motivating energy of the lecturer will have a positive impact on the learning experience of the students. When teaching and learning is not accompanied by a conscious and alert heart and when they are undertaken only for the sake of finishing a job or passing the exam, the outcome will not be very meaningful. Under these conditions, no useful knowledge can be acquired, let alone be applied to new innovations. Hearts that are fully energised do not need much monitoring and are self directed; this is so because the students know the objectives of learning and are self-guided to attain those objectives.

The foremost thing that a lecturer must do to induce effective teaching and learning is to 'touch' the students' hearts. There are many ways in which this can be accomplished, including reminding students of the scientific findings and the need for them to open their hearts and their minds at the beginning of each learning session so that the absorption (learning) process can efficiently take place. Many students automatically have a 'mental block' and think that a particular course is very difficult and boring, which indirectly inculcates the feeling of dislike towards the subject. This can be avoided by reinstating the scientific fact that by opening the heart and the mind, all signals and messages sent from the heart will reach the brain and stay there, and this later will result in positive actions. For Muslims, this is analogous to citing 'Al-Fatihah' and 'Selawat to Prophet Muhammad S.A.W.' before the start of each learning session.

 The beginning of each lecture can be personalised by calling each of the students by name in order to get to know them better. Students feel appreciated if the lecturer knows their name. While going through the class list, the lecturer should make a specific and deliberate attempt to note the unique features of the students in order to generate a mind map that can be used to recall each of the students later. Informal gestures, such as greeting students outside the classroom or during impromptu meetings outside the lecture theatre, are very helpful. With serious effort, the lecturer in charge should be able to memorise about 85% of the students' names in a class of about 150 students by the tenth week. This effort by the lecturer gives the students a moral boost to be present and involved in the learning process, which is an act that only the heart can do.

INNOVATION IN TEACHING AND LEARNING

When the hearts of the students have been 'touched', the next step is to motivate them with inspiring words to push them forward in a specific direction (i.e., towards learning). The approach here is similar to the way in which Muslim scholars of old educated their students: that is, to touch and cleanse the students' hearts before any teaching is carried out, as the heart is the source of the energy. In other words, when you touch the heart, you touch the key button to move forward.

Emulating the employment situation

A common mistake made by lecturers is to treat their students like young children. To induce a sense of responsibility and looking ahead, it is best to inform students that you will treat them like managers in an organization, and as such you expect them to deliver what is expected of them in a professional manner. Failure to deliver on time (with the right content) means that the managers fail to impress or fulfill the duty expected of them. With that tone, they become focused on their ability to perform as a manager instead of just as a student. Past personal experience suggests that this approach greatly changes the students' attitude towards learning, as they feel that they have a bigger and more important role to play.

Innovation in assessment

Innovative evaluation and monitoring should be used to induce and enhance effective learning sessions. Even the most common method of teaching can be turned into an interesting session with a little bit of imagination. As an example, consider presentations made by students. Students generally do not look forward to presentation sessions and often regard these sessions as boring and a waste of time. This perception can be changed by being more creative when planning the event. Careful planning with a predetermined set of issues to be presented by the students should be performed before the start of the semester. A carefully selected reading list that will enhance students' understanding of the chosen topic should be prepared, along with some stimulating issues to accompany the reading. In this manner, students are compelled to do the reading and have a basic understanding of the topic before meeting with the lecturer to discuss the suitability of the presentation topic and its academic content. To allow for creativity, the delivery of the presentation should be left to the imagination of the students (managers), with clear instructions that they need to do whatever it takes to make their presentation well understood and enjoyable for their peers.

Inculcating a sense of belonging/attachment

In forming the various groups for presentations, the lecturer in charge could take the opportunity to emulate the workplace situation by assigning students to work with friends with whom they have not previously worked and/or by ensuring fair representation of races and sexes within each team. Students may complain about the arrangement and having to work with 'alien' friends, but eventually they will admit the value of having the chance to get to know new people. The elected captain of the group plays a big role in uniting the mind sets of his/her teammates to focus on meeting the deadline and completing the required tasks (this is true for both presentations and research projects). The
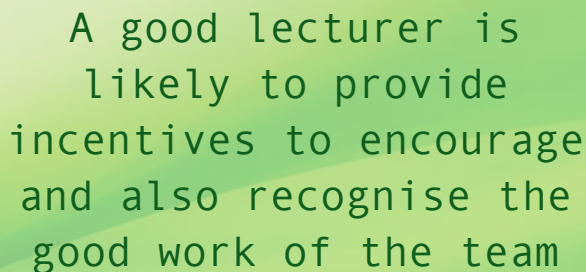
lecturer should remind the teams to find the best way to remain united in completing the task. Team members will have to meet often to discuss their division of labour, and this helps to encourage a sense of belonging and group attachment among the team members.

The team, including the captain, will have to brainstorm and discuss the best way to present the academic content without losing their classmates' interest. Knowing that the average attention span is about 12 minutes, the team has to break the presentation into several 12 minute long segments. In between the segments, the students will have to plan for something that will relax their peers but reinforce the content of the previous segment. In developing the presentation, the students also must harness the best out of every team member and at the same time deliver it effectively as a team.

Creative assessment and sharing of materials

A good lecturer is likely to provide incentives to encourage and also recognise the good work of the team. Creative evaluation strategies are likely to reinforce this objective. An evaluation could be divided into two stages, such as the professional evaluator (the lecturer or an invited expert) and the public (the non-presenting teams), with different weights assigned to each part of the evaluation. For the former, the evaluation would be more comprehensive, consisting of both objective and subjective assessments (e.g., strengths and shortcomings of each presenter for future self-improvement purposes). The role of the public judge is to give feedback about whether or not the presentation was understandable and enjoyable (creative).

> A good lecturer is likely to provide incentives to encourage and also recognise the good work of the team

A question and answer session is a useful way to evaluate the agility of the presenting team in responding to questions posed by the audience, including the lecturer in charge. As an inducement to non-presenting students, incentives could be offered to those who pose relevant questions, and some questions arising from the discussion could be selected for inclusion on the final examination. In this manner, the students are compelled to pay attention to the discussion of the issues.

Upon completing the presentation, students could be required to share their work by uploading the materials to the Yahoo or Google group created for the purpose of communication among the students and the lecturer. In this way, the hard work and extensive research of the presenting group are made available in a summarised form for other non-presenting groups to see and share. Such a forum means that the time required for students to prepare for the examination is cut short and

that students have a complete list of topics readily available for students during revision. The Yahoo or Google group also can act as a communication tool among the students so that they can discuss, express feelings, or exchange information (documents) related to the assignments, projects, and presentations.

Follow-up (*feedback and field trips*)

Almost immediately after the presentation, the expert (lecturer) should provide his/her assessment of the presentation, highlighting the strengths that have contributed to a successful presentation and the related weaknesses. Particular attention should be paid to areas requiring improvement. Weak presenters should be offered suggestions for ways to improve their communication skills, such as by attending pre-arranged field trips and/or workshops arranged by the lecturer or co-organized with the Division of Students Affairs and Development.

As an example, students who need extra help in improving their public speaking skills could be asked to prepare a public speaking programme to be given at a primary school; there they would speak in front of year 4, 5, and 6 students to build their self-confidence. Each of the presenting students would take a turn in leading an activity that requires him/her to speak publicly in front of a group of primary students in English. Past personal experience suggests that weak presenters have benefited from such outings, at least by attaining a bit more confidence in front of the crowd.

The approach described above illustrates how even the most common method of handling learning sessions can be turned into something interesting and useful with a little bit of imagination, planning, and innovative thinking. The turning point here is to 'touch' the heart and to remain modest throughout, as actions speak louder than words. This approach indirectly instils the sense of being independent, disciplined, and a leader (for the captain of the team) and of team work, creativity, imagination, thinking, and planning.

Award of the Year Session

Apart from the marks and extra incentives given for participating in the class discussion (seminar), at the end of the semester all efforts made by students throughout the semester should be recognised in a special session called the 'Award of the Year Session' (similar to events held by the creative and entertainment industry to recognise excellence). A lecturer can create multiple categories of awards, ranging from the best presenting team to the best idea ever coined by the students to the best team work of the year. Personal experience indicates that students really look forward to and enjoy this special session.

TEACHING STRATEGIES

Learning can take place in a number of different forms. The approach to learning can be varied to suit the content of the subject, types of students, and place. Teaching can be viewed as analogous to producing a film. Before the filming process can begin, the script must be ready, but before the script can be completed, the story board must be constructed. For a movie, the story board is the rough tale of what the film will focus on. For a class, the story board for a particular day's lesson should be carefully determined prior to the class period. A main story without the frills (humour, supporting actors/actresses, and related stories) is certainly not going to make an interesting film. Thus, a lecturer should supplement his/her lecture with added frills to make the learning session more interesting and lively. This can be achieved using various techniques, such as showing a short video clip related to the day's discussion that can be downloaded from internet sources (e.g., You Tube Education, Facebook, professional society websites, etc.). A common complaint by lecturers is that it is difficult to find a video that is directly related to the content of the lecture. Although this is true to a certain extent, a little bit of imagination is needed to 'visualise' the video from the many perspectives that help to build students' soft skills, critical thinking, and confidence.

Table 1: Modes of Learning and Retention Rate

Modes of Learning	
What we read	10%
What we hear	20%
What we see	30%
What we both see and hear	50%
What we discuss with others	70%
What we experience	80%
What we teach someone else	95%

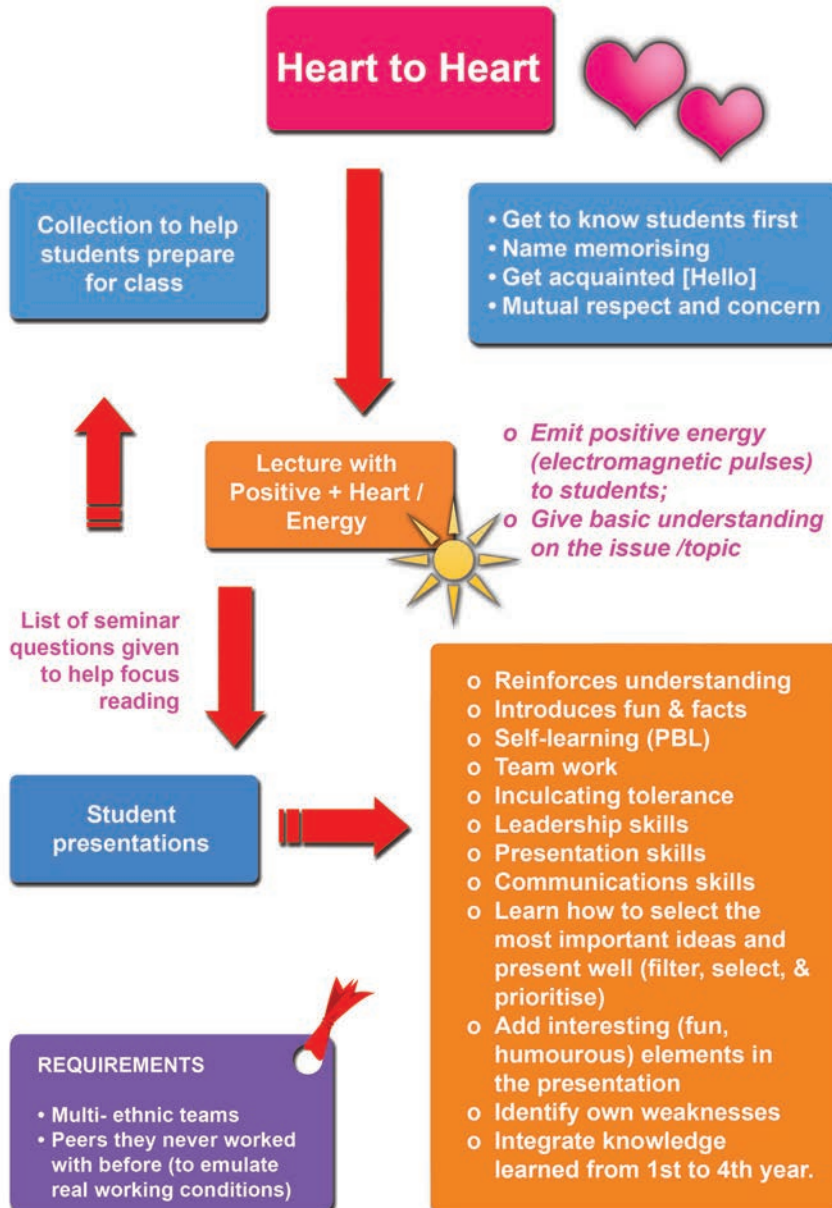Source: http://userwww.sfsu.edu/~foreman/itec800/finalprojects/raeannecarman/modes.html

Performance of a film in terms of its lasting effect on audience is largely determined by the strength of the story and the acting strength of the actors and actresses involved. In a similar vein, once the content of the learning session is ready, the lecturer must constantly improve his/her delivery by utilising his/her strengths to substitute for and conceal the weaknesses that he/she has. If the lecturer has excellent presentation skills and ways of capturing the audience's attention, then he/she should choose teaching approaches that best use these strengths. Conversely, lecturers without such skills should shift the attention from himself/herself to the materials and supplemental materials to do the job. Even for the most powerful speaker, the average attention span of an audience is limited. Thus, the learning session has to be supplemented with various learning activities rather than using only one method. Table 1 lists various learning modes and the relevant retention rate. Teaching that involves audio, video, hands-on

activities, exchanging views and presentations is likely to improve the retention rate and result in a successful learning session.

TEACHING IS THE WORKS OF THE HEART [TwH]

The TwH methodology is illustrated in the flow chart below:

Submit group presentation summary online (Yahoo Group) and as a hard copy

- Other students could follow; the reference is readily available
- Summary of readings
- Useful revision

PRESENTATION ASSESSMENT

Professional judge

Public (peer) judge

Help

Students who are weak in communications skills or have low self-confidence are invited to join extracurricular activities (e.g., Young Sustainable Program, to talk in front of young children).

Independent (2–3 persons) assignment: Choose 1 out of 4 topics

Grade

Award of the Year Session

TEACHING CHALLENGES AND SUGGESTED SOLUTIONS

Thus far, the teaching from the heart philosophy has demonstrated techniques and activities that allow hearts to remain connected and energised. The big asssumption behind this philosophy is that the lecturer is the driver or the source of the energy and that he/she remains fully energised throughout the class period to share positive energy with students. As such, this approach requires lecturers to remain fully motivated and cognisant that they are constantly being watched by the students and the Creator of the Universe. 'Nothing but the best' should be the motto for lecturers so that they always look for new and better ways to improve delivery and content.

CHEERFUL VS GRUMPY LECTURER
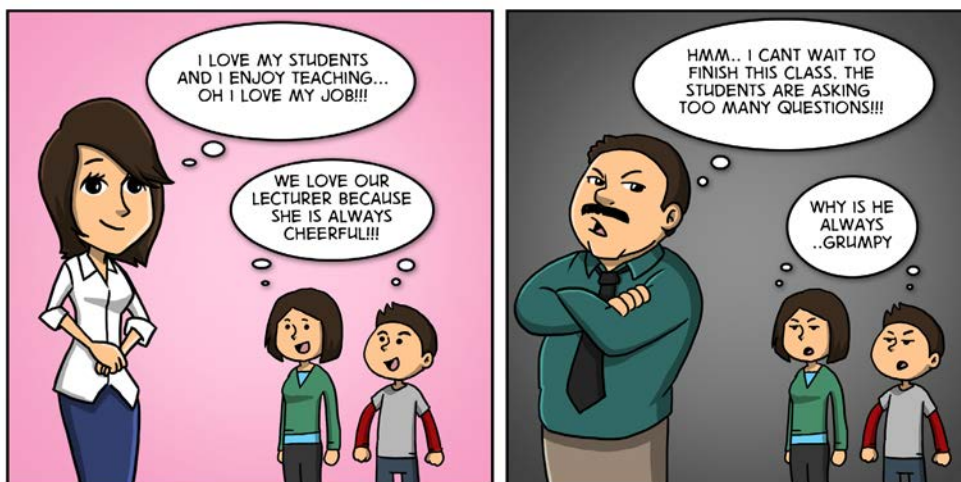
Listed below are some of the common challenges faced by lecturers when pursuing an effective learning session and some suggested solutions on how to overcome them.

Challenge # 1 – Reviving learning determination

- How to revive the 'learning spirit' of students?
- How to induce students to be interested in reading academic-related materials?
- How to help students read journal articles that often are difficult to read and understand?

Suggested solutions # 1 – Reviving learning determination

The approach to teaching has to be changed to become more interesting and interactive in order to ensure that the hearts of the students are present and fully motivated. Here are some suggestions for how to achieve this.

Heart-to-heart approach

- To love is to know first: Get to know students via the attendance list; not so much monitoring but trying to remember salient features of each student to get him/her interested in class by 'touching' his/her heart first.
- Memorise students' names to make them feel important and respected.
- Suggested milestone: By week 5, have 50% of students' names in an average class size of 100 memorised; by week 10 aim for 85%.

Diversifying Teaching Approaches / Techniques

To attract students' interest to learn and understand the academic content of the course, there are a few types of learning approaches that can be introduced simultaneously:

Inculcate interest in knowing/finding out more about a subject matter:
> Short video clip/case studies about a particular issue that is downloaded from the internet

Summarizing/explanation of a particular topic:
> Prepared ahead of time and distributed via email or uploaded to an online group (e.g., Google/Yahoo group) for the class
> Motivated and interesting lecture supplemented by current issues relating to the topic of the day to inspire and bring out the curiousity in the minds of the students

Student presentations to enhance and reinforce learning:
> Move away from the traditional and status quo of conducting student presentations; it is not about forcing students to come to the front and start talking, rather it is more than just that.
> Help students from the start by helping them develop interest in the topic assigned with a list of useful issues to take their thinking further. Provide a list of reading to develop basic understanding, and encourage students to have frequent discussions with you to delineate substantially worthwhile issues (topic) for interesting discourse.
> Give students the flexibility needed to bring out the best in them, and encourage them to think 'outside the box'while still maintaining the essence of the topic. Give them extra incentives for coming up with something new and creative. Lots of encouraging words are really needed here.

Challenge # 2 – Concern about the latest developments

- How to train students to be concerned about the latest developments in the discipline and also the environment around them?

Suggested Solutions #2 – Concern about the latest developments

Discuss interesting current events and connect them with the subject matter. For example:

- How the world's economic crisis possibly started with the latest accounting technique - Fair Value Accounting – even though evidence suggests that the capital market is efficient
- How Fair Value Accounting created the feeling of panic among investors and potentially created the crisis.

Challenge # 3 – Develop critical thinking

- How to help students develop critical thinking? Challenging the accepted paradigms and not believing whatever is being told before undertaking one's own examination of the issue.

Suggested Solutions #3 – Develop critical thinking

Problem-based learning could be used to help to develop critical thinking skills. Assign a project on day one of the class with a deadline in view. Purposely focus the question on an issue that has no absolute answer (no one right answer) or on a contentious issue that can work both ways, with advantages and disadvantages representing the various schools of thought. Ask the student to state his/her opinions on the matter and the logical reasoning behind this choice. Give incentives to students who dare to speak of views that differ from the status quo and that are based on logical thinking.

Challenge # 4 – Develop ethical values and discipline

- How to inculcate ethical values proactively and encourage the practice of such behaviour?
- How to encourage good discipline among students?

Suggested Solutions # 4 – Develop ethical values and discipline

- Lead by example, seeing is believing: Lecturers must practise what they preach by being in class on time, keeping all promises, consciously avoiding non-examplary values and actions, and showing a high level of professionalism (e.g., timely return of exams, assignments, projects, and coursework marks).
- Treat students like colleagues, and show and expect mutual respect.

Challenge # 5 – Develop soft skills and employment readiness

- How to develop the right attitude for employment?
- How to develop the needed soft skills, either directly or indirectly?

Suggested solutions # 5 – Develop soft skills and employment readiness

- Employment readiness: Treat students as managers in charge instead of as students; this raises the students' moral tone.
- Purposely design a series of discussion topics or cases in such a way that knowledge from various disciplines is needed to answer the questions or to solve the problems. From time to time, remind students to balance theories with practice to encourage answers that would emulate work situations.
- Soft skills: Encourage students to fully utilise their strengths in preparing for the presentation. Design the presentation to include a question and answer session so that students are able to defend the position that they are taking in presenting the materials. Provide immediate feedback to students upon their completion of the presentation with suggested areas of improvement, especially in terms of inter- and intrapersonal communication skills.
- If possible, arrange for a field trip where students can get engage themselves in community work and practise their identified shortcomings, especially those involving inter- and intrapersonal communication skills.

EPILOGUE

The discussion and suggestions throughout this chapter point to one important thing that many of us who have been lecturers for a long time may have taken for granted or even lost without even realising it: teaching nobility and/or integrity. Although the performance measurement system may or may not recognise a teacher's contributions, a true lecturer gives his or her best regardless of the rewards at hand. The teaching from the heart philosophy is grounded not on the techniques used to teach students but on connecting the hearts of the students. To teach is to connect with the students and the subject matter, and this process is enriched by employing various techniques to enhance effective learning. It is not the technique that makes the difference; it is the individuals' identity and his or her willingness to connect intellectually, emotionally, and spiritually (Palmer 2010). Teaching is the work of hearts.

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WHAT IT TAKES TO BE A GOOD PHYSICS TEACHER

I was recruited to work as a lecturer at the School of Physics at Universiti Sains Malaysia (USM) in 2003. Since then I have been deeply involved in the teaching of undergraduate-level physics courses. The courses I have taught include Mechanics (the 101 physics course, which is almost universally a course that any undergraduate-level physics student must take), Modern Physics, Thermodynamics, Linear Algebra and Calculus, and Statistical Mechanics. I am not only a physics instructor but also a mathematics teacher. Teaching physics and mathematics is full of both fun and challenges. The public regards learning physics as a daunting endeavour. In fact, explaining physics is even more daunting. Richard Feynman, the legendary physics Nobel laureate and great physics teacher, used to say '… if I could explain it to the average person, I wouldn't have been worth the Nobel Prize' (Gleick, 1992). As a physicist and a physics teacher, my core belief is that physics and mathematics are comprehensible. Ironically, many physics students still think otherwise.

'… if I could explain it to the average person, I wouldn't have been worth the Nobel Prize'

(Gleick, 1992)

In my opinion, a physics teacher who can make physics comprehensible must have a few essential qualities: He/she must master effective techniques for delivering ideas, have knowledge of the subject matter, and have a passion for delivering the first two. You can not be a good physics teacher if you lack any of these characteristics. For example, P.A.M. Dirac, who was one of the most important physicists in history and whose contribution to physics is on par with that of Einstein, was said to be the most boring physics teacher (Farmelo, 2011). He used the most economical and concise mathematical language to lecture physics to students, but he never bothered to elaborate further in plain language. Most students were left in a state of confusion when Dirac left the class. As a physicist, Dirac had the most profound insight into the mathematical beauty of physics theory, but he lacked the passion to deliver what he knew to grass-root-level physics students. On the other hand, one can never teach beyond the level of one's own understanding. In the teacher-centred setting, this would mean that it is logically impossible to be a good physics teacher if the instructor knows too little about the subject matter.

In practice, many physics teachers merely spoon feed formulas to their students, which then are blindly memorised, and recycle past-year questions in the final exams. The level of comprehension of the core ideas usually is not tested rigorously. In many instances, exams require students to simply vomit the model answers as memorised. Thus, the ability to score a high grade on a physics exam is rarely translated into a reasonable comprehension of the complete idea behind what has been memorised. In contrast, in my opinion the best way to show whether learning has truly taken place is to have students demonstrate their ability to apply the knowledge content in research projects and to correctly explain them in such a manner that others can comprehend them. It is also in this spirit that Feynman defined a person to have truly understood a physics concept.

Teaching physics to a class of undergraduate students ultimately boils down to how to convey a foreign, and often abstract, concept to the audience. To achieve this, various effective techniques and tricks can be used. Throughout the last few years, I have developed various methods to make undergraduate physics a comprehensible subject. I also feel deeply that to deliver good teaching I must know my subject matter well. In addition, genuine motivation from within is also a mandatory fuel that helps me remain innovative. Innovative methods in teaching may be merely strategies or convenient tools dressed up with fancy technologies. However, what essentially drives the implementation of these tricks is personal passion.

PHYSICS LABORATORY

LEARNING AND TEACHING WITH TECHNOLOGICAL MEDIA

With the commencement of the NET.2 era, applying electronic media technologies in teaching has become a fancy trend. Students sitting in the classroom can easily be bored by conventional teaching approaches, such as chalk-and-talk and reading mechanically or monotonously from the slides. The use of electronic media in teaching has the potential to offer many surprising elements to ward off classroom boredom. Inserting a lively computer simulation or 'Googling' on the projected screen in the lecture hall, for example, combats boredom and arouses students' expectations. As a physicist with some experience as a computer end user, I personally have used quite extensively some electronic media to assist my teaching. However, I am fully aware that such technologies are merely means to an end rather than the end itself.

Course websites

The first website I built was for the ZCT 104 Modern Physics course back in 2003. This was the first course I taught at USM. Back then, having a website for a course was not the norm on the USM main campus, although many universities overseas had begun using course websites as early as the mid 1990s. I took the difficult first step to build my first course website despite unfavourable conditions. As late as 2007, USM finally pushed for the implementation of Moodle, which is an online web service where lecturers can drag-and-drop course-related material online fairly easily.

Today, I insist on having a website for each course I teach because that is the way to go for effective and efficient course material management. I have accumulated many course websites, which are archived in my personal webpage. These websites document my teaching experience and the activities that I have practiced throughout the many years of my teaching career; moreover, they are accessible by anyone, anytime, and from anywhere with just the click of the mouse on http://www2.fizik.usm.my/tlyoon/teaching. This archive is a reference for my present students who wish to peek at the teaching activities from previous semesters. It offers historical information about how the same courses were conducted in the past, thus preparing the present students psychologically as to what to expect in the present semester. In particular, students find it interesting to read about the discussions held by their elders in the forum of the same courses in previous years. As these discussions specifically revolved around the particular course they are currently studying, there is a sense of relevance when the present students read them. This contributes positively to my process of teaching in the classroom. Reflecting my core belief in transparency and liberalism, all of the course web pages I post are configured to be viewed freely by anyone in the world without the need to key in a password.

Ideally, I try to make it so that students can access online all possible information related to the course. Such a practice saves me the trouble of replying to students' SMS requests (e.g., Where and when will a test happen? What topics are to be tested?). When the course websites are fully loaded with essential information, students have no reason to complain about having insufficient material for their learning purposes. The essential contents of a course website include the following:

Synopsis and course-related information—This includes the course synopsis; all relevant information, such as the reference textbooks, exam format, and important dates (tests, holidays, extra classes); a lecture-by-lecture schedule; criteria for grading; and advice and best practices for the course.

Electronic copies of lecture notes and the latest tutorial problem sets— Past year questions, usually completed with full solutions and marking schemes, are provided. The inspiration when designing exam questions usually is derived from various reference sources (mostly the textbooks and test banks). In the solution schemes, the sources of the exam questions often will be quoted. My purpose is to provide transparency in the process of how I design exam questions. This offers students a window to track their lecturer's thinking path when designing the questions. I believe that such information is beneficial to the learning process for the students.

Latest solutions to the quizzes— These are uploaded, usually immediately after a quiz was taken. The immediate release of the electronic solutions is useful to the eager students who cannot wait to see the answers.

All-in-one course material— I take the trouble to electronically bind all of the latest lecture notes, tutorial questions, past year solutions, and other course-related material into an all-in-one pdf version, which I then upload to the course website. I also send the soft copy to the photocopy shop so that students can purchase hard copy I they wish.

Announcements— The course website is the best place to make announcements. News spreads in cyberspace almost faster than the speed of light these days.

Records of past year performances in the course— This includes records of the grade distribution and the formal reports of overall exam performance. The formal reports contain information such as weakness of the students and comments made by the lecturer about the overall course performance. This is 'confidential' information that usually is not available but is very much sought after by students. When made publicly known, an historical statistic about an average 45% failure rate over the last two academic sessions sends the following strong message: If you don't want to be part of the statistics, you better start working now. It is a psychological trick I use to motivate students, albeit in a threatening manner.

Forum—The forum is one of the most important component of a course website. It is the main attraction for students to visit the course web pages. Here, students read their peers' postings, chit chat, ask stupid questions, or simply drop a line for fun. Some ask serious questions, debate certain opinions, or seek quick answers to their assignments. I am usually the central participant in the forum, aided by the occasional appearance of a few active online students to heat up the ambience. A typically reserved student can turn out to be quite outspoken and daring online. Meeting and discussing physics with the students in cyberspace provides an alternative channel to interact with them. The students get to know my character and personal style better if they bother to read my postings on the online forums. In my opinion, a student's awareness of his/her lecturer's personal traits and teaching style helps to boost the learning and teaching experience. To encourage participation I maintain a free speech policy in the forum. As long as their postings do not violate the obvious social constraints, I never interfere. All kinds of topic are sanctioned, such as

advertisements, expression of fear about the course, or even blatant objection to my teaching style. I try to talk like a student, using SMS style or even broken language, to make them feel comfortable about expressing themselves online. Maintaining an active course-related forum has many obvious advantages to increasing the students' interest in the course. However, involvement in a heated forum can take 1–2 hours per day of my precious time.

Moodle: The online learning management system

In earlier years, I built my course websites on the server of the School of Physics (and elsewhere as well). These were very simple websites that did mundane things such as displaying texts, files, and links. Moodle, which was introduced at USM around 2007, offers much better functionality so that I can build course websites that are much superior to those built in the past. Moodle allows many course-related events to be managed online smartly so that lecture hours can be spent solely on lecturing. Moreover, if a group decision has to be made, Moodle is the platform to do it, as it is much more efficient than counting the show of hand in class.

One of the very useful services offered by Moodle is the online assignment submission function. Lecturers can enforce the deadline for last submission, grade the assignments online, and display the grades very conveniently. This means that assignment submission is efficient and it saves paper (and trees). I believe that every lecturer who requires their students to submit assignments should do so via Moodle as a contribution to saving the Earth.

Moodle also provides a function called 'Wiki', in which students can freely edit an encyclopaedia-like entry related to a particular concept or keyword related to the course. Students are encouraged to edit or add to Wiki entries so that the content of these entries can be perfected over time as a result of collective effort. This is such a wonderful new concept for teaching and learning, thanks to the brilliant invention of the Wikipedia model. I tried to encourage the use of Wiki in my calculus and linear algebra course once. Except for a few rare enthusiasts, the Wiki drew little response from the students, probably due to the students' lack of familiarity with editing Wiki entries. Despite the failure in this particular class, I believe that student editing of Wiki entries can be an effective strategy for collective learning when properly used.

Although complementing a course with a website is not the most important factor for successful teaching, use of this tool can be a smart means to help make good teaching a more plausible task.

Online resources and Java simulations

An almost infinite number of interesting web-based resources are out there, some of which could be directly relevant to the courses one is teaching. These include, for example, lecture notes, simulations, free textbooks, live lectures, and problem sets. My course web pages usually include internet links to these resources for enthusiastic students to follow how others learn the same course in other parts of the world. To choose the links, I must first filter them. This job is a very fruitful learning process by itself. I get to learn what other physicists do to deliver the same topics that I am going to teach.

Other than online resources, physics textbooks also come with Java simulations in the form of an attached CD that is given for free to instructors by the publisher. On these CDs, physics instructors

can find many computer simulations useful for teaching demonstrations. Traditionally, the physics laws are taught and explained using figures and verbal and oral explanation by instructors, whereas the formulas are rote-memorised by students. The symbolic mathematical equations, which encode a profound amount of constraints on how a physical system should behave in space and time, make no sense to many students. They just cannot make the connection between these equations and the real world. Computer simulation is a very effective tool to convey the relevance of the physical laws to our world. Thanks to Java simulations, I have much less trouble explaining a complicated phenomenon governed by a lengthy formula to the class when I simply showing a simulation on the screen. Moreover, simulations easily catch the attention of the many online gaming geeks in the class. In addition, simulations wake up those students who are halfway or already asleep. Java simulations are now widely and easily available, and it is a waste if physics teachers do not make use of them to facilitate quality teaching.

Electronic gadgets to aid teaching

Some lecture halls at USM are so huge that at times I imagine I am conducting a concert in a 50,000 capacity stadium. Even in moderately sized lecture halls or classrooms, writing on black/white boards is something that students hate for me to do for the simple reason that the writing appears too tiny on the board. Heeding their complaints, I purchased an electronic gadget know as the 'Easy Note Taker'. This gadget allows me to project my writing on a piece of paper onto the screen via the laptop. In addition, the writing can be electronically saved and uploaded to the course website. This gadget worked very well and effectively for a while, but unfortunately it broke down after one semester.

Mathematica for teaching

In the calculus and linear algebra course, it can be difficult to explain clearly certain abstract mathematical concepts, such as taking the limit of a function or the convergence of a series. Thus, I use Mathematica to facilitate the teaching of this course. Mathematica is a very powerful software package that can perform many mathematical manipulations, such as displaying the graphs of complicated functions and performing algebraic and numerical integration and differentiation. It has proven to be quite a workable alternative approach to teaching mathematics. Students generally are amazed by the power of Mathematica when I demonstrate it in the class. The abstract symbols in the textbook suddenly manifest themselves into vivid graphical form that is visualisable on the screen. This visualisation helps to convert an abstract mathematical concept into a concrete picture for easy digestion.

Using Mathematica for teaching can be quite effective. However, I am also aware that this computational tool may divert the students' attention away from the core mathematical concepts, resulting in erroneous focus on the software rather than on the mathematics itself. In addition, overuse of Mathematica demonstrations in the class may also cause unnecessary confusion to some weak or technophobic students. Therefore, I use Mathematica only in a few selected lecture slots in order to successfully obtain the response I want: students who are impressed and amazed and who focus all of their attention on the lecture.

I also use another trick to attract students' attention. I write a Mathematica code to randomly pick a student for questioning during the lecture. For maximum impact, I project it on the screen keystroke by keystroke to demonstrate the process of how I run the code for the random selection. The atmosphere becomes excited when the class sees the screen displaying the Mathematica code. Again, I gain what I wished for: their attention and aroused interest in my class.

SMS for Q&A

Our Asian students are traditionally quiet and never speak or ask questions in public, and this is even more predominant in the lecture hall. Thus, lecturing at USM can be boring because the teacher rarely is queried publicly. One day when I observed many students busily but quietly SMS-ing when I was speaking, I had a moment of inspiration: Why don't I get them to SMS me instead? I announced my mobile phone number to the class, and from that day on my hand phone SMS alert tone began to ring constantly during lectures because students started to ask questions during class using SMS. Every SMS question sent during a lecture creates a rapport between me and the anonymous SMS-sender sitting among the students. This method works quite well, and I use it in every course I teach.

Electronic gadget

Online resources & Java simulations

Java

SMS for Q & A

Learning & Teaching with Technological Media

Wolfram Mathematica

http://w

Course website

Moodle

Mathematica for teaching

TEACHING STUDENTS TO THINK LIKE A PYSICIST

Physics is a difficult subject for both students and teachers. Many factors contribute to this impression, such as a structural deficiency in our education systems and the poor appreciation of an intellectual culture. University education in many ways is simply yet another secondary school setting within a larger campus. Students memorise the formulas and concepts and spew them out again in the exam halls, but they never appreciate the intellectual process underlying how these concepts are formulated. To many students, physics is merely a collection of formulas that can be used to calculate certain problems. When given a physics problem, what comes first to their minds is to scan for the right formula from their memorised database rather analysing the problem using a more robust approach. Such a mechanical practice is the norm among the students and has saved many 'lives' in the exam halls. However, this approach also has deprived them of the opportunity to think like a physicist.

In a typical classical mechanics course, for example, various 'must know' concepts or theories are taught, such as how to describe the translational and rotational motion of a point particle or a rigid body and the classical concepts of forces and gravity. These are specific pieces of knowledge that have to be learned by students (and they are tested in the exam hall). However, these specific concepts and theories are different in nature from the more general, and somewhat more abstract, aspect of the physics methodology used to formulate them. Thus, at this point I would like to make a distinction between physics concepts (or theories) and physics methodology (i.e., 'the way how physicists think' or the 'physicist's paradigm'. Teaching physics and mathematics should not just involve the presentation of facts, concepts, formulas, and techniques to perform calculations. It is equally important is to teach the students how to think like a physicist.

The physicist's paradigm is characterised by clear logic. Physicists think along a logical track when formulating a quantitative description of a physical system. They are able to distinguish one logical thread from another and see the connection between them. Logic is spoken in the language of mathematics, hence physicists are intensive users of mathematics. They have to translate an idea or a theory precisely using the language of mathematics because physical reality is represented using mathematical symbols and equations. Physicists must know how to extract information from observations and put it coherently into a mathematical form for further logical manipulation. They conduct experiments on a physical system and take measurements, then use mathematics to build a model to describe the physics as inferred from the experimental data. Physicists have to perform smart simplification when building models to describe a physical system. They need to know how to deduce physical consequences or inferences from a set of mathematical equations. They often apply tricky mathematical procedures, such as making approximations at different levels of accuracy, when approaching a complex system. Very often they need to be smart enough to spot the underlying similarities between two disparate systems so that the theoretical treatment used for one system lends a helping hand to describe the other. Sometimes physicists simply have to be clever enough to put forward a smart guess to tackle a clueless problem. This set of methodologies used by physicists is an art practiced by all, yet it is not mentioned explicitly in most physics textbooks. It can only to be acquired after a long period working in the area of

physics research. When I teach, I try to at least create an awareness of the physicist's paradigm among my students.

When I teach physics, I explain the mathematical formulas and theories and illustrate the physical laws using working examples, as does every physics teacher. On top of that, however, I also insist on explaining how a physicist thinks and the physicist's methodology when dealing with a physics problem. I believe that this aspect is less emphasised by most physics teachers, who often feed formulas to the students without properly explaining their origin or the thinking process behind them. Our education system is inclined to force students to memorise the outcome of the thinking process (i.e., the formulas formulated by the physicists) but never to teach them to appreciate and comprehend the thinking process itself. However, teaching and training students to comprehend the physicist's way of thinking are no easy tasks. Translating a physics concept into a mathematical form is an abstract and highly intellectual process. To understand the paradigm requires a certain level of intellectual maturity. I myself was not aware of the existence of such a paradigm when I was a physics undergraduate. The usual way to teach the paradigm is by way of examples, and I use them to elaborate and comment on the process and approaches used by physicists when solving a specific problem. I think that the inclusion of the physicist's paradigm in my teaching makes me slightly distinct from other physics teachers.

What gets measured gets done

Assessment is split into two parts in my courses: 30% course work and 70% final examination. The simplest way to assess course work is via tests, which usually last for an hour each. The final examination is a necessary evil, as it is needed to measure the level of understanding of the students, and it is a standard 2–3 hour written evaluation. There is little flexibility on how the final examination is conducted. Fortunately, there is more room to manoeuvre with course work assessments. I make good use of such assessments to gauge, force, and motivate students to learn continuously throughout the semester. As a means to motivate students to revise their lecture contents continuously, I devised a so-called 'what gets measured gets done' tactic. With this tactic, weekly quizzes are given, and the solutions are 'instantly' uploaded online once the quiz has been completed. In this way, students can check the quiz answers right away. The latest grade distribution statistics also are updated as soon as the most recent quiz is graded. Occasionally I comment on the latest grade distribution curve as a tactic to alert the class of their overall learning progress. The key words here are 'instant' and 'latest online update of the grade distribution information'. Through the internet, the immediate release of quiz solutions and the most updated course work information have an immediate psychological impact on the students, as it gives them the feeling that they are constantly 'being measured'. This strategy has a positive impact on the learning attitude of the students.

Experimenting with the best ways to assess course work

In addition to short quizzes and tests, I have also devised various not-so-conventional ways to assess students in my continuous effort to optimise the quality of the assessment. Below are some examples of my attempts.

The open book quiz—An open book quiz can be administered right after the lecture on a chapter is completed. Usually an open book quiz means that the solutions are not directly available in the standard textbook. Open book quizzes free students from the almost compulsory practice of rote memorisation. On the other hand, despite having the standard textbook available for reference, students find themselves being challenged and are forced to think even harder. However, this approach did not work out very well for me. Except for a few students who could think outside the box, most students who were average in their learning and thinking abilities failed to do well on these quizzes. The overall course work grade for the class was so poor that I never again gave an open book quiz.

The 'Sample Questions by Students' initiative—With this approach, I invited students to design formatted objective questions based on the topics covered in the course. These objective questions had to fulfil certain criteria; they had to be original (no cut-and-paste from existing resources), conceptually correct, creative, and interesting. Copy cat or boring questions were filtered and rejected. Once accepted, the designer of the questions was given bonus marks. The accepted questions were edited or corrected by me and then stored in a question bank, which, like all other course-related material, was accessible online. As an incentive I also promised the students to use some of the selected questions on the final examination. This initiative promoted a good sense of participation in the teaching and learning processes. In addition, designing an original objective question demands good knowledge about the subject matter. Creating sensible questions deepens the level of understanding of a particular concept in the question designer. A student who attempts to design a question inevitably must also get involved in an in-depth learning process. This is a wonderful and interesting way to learn. Overall, I received 143 designed questions; this translates to less than 20% of the students, and many of the questions were copy cats. However, those who were enthusiastic found the initiative to be an interesting learning experience, and it aroused a sense of participation, at least among those who submitted questions. On the negative side, filtering through and editing all of the submitted questions were exhaustive tasks. Thus, the expensive cost in terms of time and effort led me not to use this technique again. It is otherwise a good way to promote learning, and I recommend it for smaller classes. Include students and tutors in the editing and filtering process would be helpful.

The quality of exam questions

An unhealthy tradition is that students like to memorise formulas, facts, and solutions of past year questions when preparing for an examination. Teachers should find ways to avoid this practice (e.g., do not recycle past year questions, design questions that genuinely test the level of the students' understanding). To put this into practice, in some of my examinations I include a multiple choice question section that contains between 20 and 40 questions. These consist of non-calculative questions that can be answered without a calculator. These questions are designed with the specific intention of testing the level of understanding of the theoretical aspects. This section is 'notorious' among the students because one has very little chance of choosing the correct option without having any in-depth knowledge of and logical thinking about the particular concept being tested. In addition, these questions are never recycled, hence a student cannot answer the questions correctly by memorising the past year questions. After the examination, I upload the answers and solution scheme to these multiple choice questions to the course website. The solution scheme might also indicate the source

from which these questions were adapted or inspired. However, a large percentage of these objective questions are original. After a few years of teaching Modern Physics ZCT 104, for example, a large body of objective questions have accumulated. These solutions are themselves valuable examples that can be used to illustrate the application of the physics concepts taught in the course. When I design these examination questions I keep in mind that these question sets will become a source of knowledge for future students. Preparing these multiple choice questions demands quite a bit of effort, and they also must be translated into Bahasa Malaysia, which often means another whole day of work for me.

The quality of lecture notes

After many years of observation, I have come to realise that physics classes are mostly dry, boring, and sometimes scary. In contrast to this observation, my core belief is that physics is not a dry or boring subject. It is intellectually lively, interesting, and closely relevant to our real world. I strongly believe that it is possible to make the physics teaching process fun and interesting, if one bothers to do so. The actual presentation during the real lecture is the single most important criterion that determines whether a physics lecture is interesting or not. At the same time, the quality of the lecture notes directly affects the quality of a lecture in progress. Therefore, I make a serious effort to prepare quality lecture notes. For example, I would never include any statement that I myself do not understand. My lecture notes undergo a constant process of evolution, correction, and modification in an effort to improve quality. Therefore, a complete set of lecture notes for a course could take up to 200 hours (or more) per semester to create. I also commonly make major modifications to the existing lecture notes or even completely rewrite them. As an example, this happened in the first few years that I taught the Calculus and Linear Algebra (ZCA 110) course: I wrote approximately four effectively different sets of lecture notes before finally settling on a stable version.

As a matter of personal policy I always try to factor in two important elements in my lecture notes. First, there must be as many 'fun' elements as possible in the lecture materials. Second, the course material should prompt the students to see distinctly the relevance between the theory they learn and the real world in which they live. To achieve such effects, I use a strategy proposed by Tony Buzan (Buzan, 2002) the creator of the mind map. According to Buzan, our mind is attracted most easily to colourful and graphical objects, as well as to objects that provide ample space for imagination. To this end, my lecture materials are packed with graphics, cartoons, animations, questions that arouse curiosity, comics, physicists' bibliographies, poems, literature quotes, history and philosophy of physics, and other things that are surprisingly unexpected in a physics lecture note. As an example, I used the movie *Lord of the Rings*: *The Two Towers* as a scenario to illustrate the concept of simultaneity in my special relativity class (Figure 1).

Figure 2 is a slide taken from the modern physics lecture notes; it mentions the controversial role played by the physicist Warner Heisenberg during World War II in the Nazi Germany. I like to tell interesting stories and share inferences derived from such figures in the lecture hall when they appear on the screen. This story telling part is what the students like best in my lectures. Figure 3 is a classic slide from my modern physics course that is designed to prompt suspense in the audience: *'Can one travel through a distance of 200 light years within one's life time?'* The students are kept in a suspense

mode until the end of the topic, when they fully comprehend the idea of time dilation and length contraction as predicted in the special theory of relativity.

Example 38-2: Simultaneity of the Two Towers

Frodo is an intelligent observer standing next to Tower A, which emits a flash of light every 10 s. 100 km distant from him is the Tower B, stationary with respect to him, that also emits a flash every 10 s. Frodo wants to know whether or not each flash is emitted from remote Tower B simultaneous with (at the same time as) the flash from Frodo's own Tower A. Explain how to do this without leaving Frodo position next to Tower A. Be specific and use numerical values.

Figure 1: The two towers as they appeared in the movie 'The Lord of the Rings' were used in a scenario to illustrate the concept of simultaneity in the special relativity class.

Heisenberg's uncertainty principle (Nobel prize, 1932)

- WERNER HEISENBERG (1960 - 1976)

- was one of the greatest physicists of the twentieth century. He is best known as a founder of quantum mechanics, the new physics of the atomic world, and especially for the uncertainty principle in quantum theory. He is also known for his controversial role as a leader of Germany's nuclear fission research during World War II. After the war he was active in elementary particle physics and West German science policy.

- http://www.aip.org/history/heisenberg/p01.htm
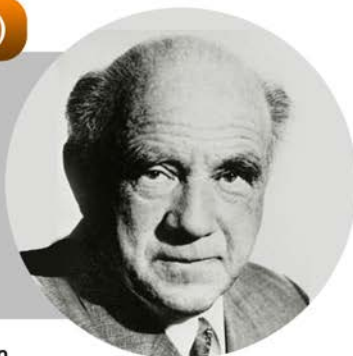
Figure 2: The bibliography of Heisenberg, one of the fathers of quantum mechanics, as it appeared in the ZCT 104 lecture materials. Students learn some physics history in addition to the uncertainty equation .

An open-chapter question

- Let say you have found a map revealing a huge galactic treasure at the opposite edge of the Galaxy 200 ly away.

- Is there any chance for you to travel such a distance from Earth and arrive at the treasure site by travelling on a rocket within your lifetime of say, 60 years, given the constraint that the rocket cannot possibly travel faster than the light speed?

Figure 3: A suspense-creating question is asked at the beginning of the session, and it is resolved only towards the end of the lecture after the students realised what time dilation and length contraction, as predicted by special theory of relativity, really mean.

The invaluable reward for a dutiful teacher

Preparation of lecture notes is a learning process for a teacher even if he/she has already known the subject matter for many years. Personally, I use the preparation of lecture notes as a re-learning opportunity to gain new insight into the physics and mathematics both known and unknown to me. For example, suppose I know nothing about 'vector space' or a 'basis set' in linear algebra or a 'grand canonical ensemble' or 'chemical potential' in statistical mechanics. Despite my knowledge of these topics being effectively zero before undergoing the painstaking lecture preparation process, I become able to lecture to an audience of ~ 100 students in the linear algebra and statistical mechanics classes. I used to tell my statistical mechanics class that in terms of knowledge gained, I was the person who benefited most from my own lectures. The knowledge that I taught to the statistical mechanics and calculus and linear algebra classes turned out to be applicable later when I embarked on my research in computational condensed matter physics. Thus a realisation in me arose: Invaluable indeed is the reward to those who bother to teach dutifully.

Self-reading initiative

In one of my linear algebra classes, I attempted an unconventional approach that lasted for a period of 3 weeks. In this initiative, dubbed the self-reading initiative, a textbook on linear algebra (Matrices by Frank Ayres, Schaum's Outline series [4]) was selected and students were directed to prepare and study a few selected chapters before entering the class. Assuming that the students had done their preparation, I provided a very brief introduction to these topics (say for 10–15 minutes). I then asked the students to attempt a specially designed problem set (which was uploaded online before the class) during the rest of the lecture. When the problem attempting session was over, I discussed the problems in a more detailed manner. As a strategy to ensure that students prepared for the class, randomly selected students were asked to provide the solutions for grading. This initiative was a bold attempt to provoke proactiveness in students who are pampered by a spoon-feeding culture. I hoped that this initiative would promote an active form of learning (although delivered somewhat forcefully) in which student themselves would shoulder a major portion of the responsibility for acquiring knowledge.

Typically, like many other books by great mathematicians, Ayers' book is highly condensed, precise, no-nonsense, and 'unfriendly'. The topics are presented in the form of a sequence of theorems. Its 'explanations' are mostly in the form of concise mathematical statements that are beyond the level of most first year students. Thus, my job was to render these theorems understandable to students. To this end, I designed an original and coherent set of designed problems based on Ayer's book to illustrate the essential ideas of the theorems via working examples. The essential ideas of the theorems Ayers included in his otherwise incomprehensible book could be comprehended after the students had gone through these designed problems.

In this initiative, the students played a more active role than in a conventional mathematic class. Instead of me spending the whole class period lecturing, students learn by attacking the designed problems themselves. I would describe this initiative as successful. Many students in the class enjoyed

the unique learning experience in those 3 weeks of the linear algebra course. I derived a good sense of personal satisfaction for designing and implementing this experimental approach.

Conscientious teaching

I stand by the principle of academic integrity. In other words, I do not pass a student who cannot demonstrate the minimum knowledge required of him/her (which is ultimately measured by his/her examination score). Therefore, the failure rate in my classes has been consistently high (30–50%) throughout the years. The USM standard is as follows: 39 out of 100 or below is considered partial failure, whereas a complete failure is < 24. In general, the grade distribution curves are healthy (i.e., bell shaped), despite the average peak at the low side (C or C–). The only exception is a second year statistical mechanics course, for which the distribution displays an M shape. This course is a rather difficult subject, and a large portion of the class simply cannot follow the highly demanding mathematics and the abstract language used in statistical mechanics. I believe that the high failure rate in my class reflects my reluctance to compromise on the evaluation standard. In contrast, many courses never fail a single student (a situation which is rather contrived).

I believe that students should be evaluated based on how much they understand, not how much they can memorise. However, my observations indicate that many professors and lecturers, mainly for their own convenience, routinely use past year questions on the final examinations. Moreover, some professors design poor quality questions. As a result, students who know next to nothing pass and even score well on the exams by blindly memorising past year solutions or the lecture notes. Such lecturers have allowed this rote learning practice to become the norm among the students, and I do not call this conscientious. Exam questions should be designed in such a way that they can effectively sort out those who know a lot and those who know nothing. I make the effort to ensure that the exams I design are good measuring tools that manage to discriminate the students based on their knowledge levels. If every lecturer practiced conscientious teaching, students would start to change their learning attitude and avoid cutting corners. Conscientious teaching leads to real quality learning. This is what learning and teaching is all about.

Let them choose their ways

As a matter of principle, I do not agree with forcing attendance on students. Learning is a very personal process. Ideally, learning should be an initiative that spawns from the learner's own willingness. Undergraduates should be treated as adults who will shoulder the consequences of their own actions. Treating undergraduate students like primary school children, as many university academics currently do, deprives the students from attaining maturity. Our education culture tends to be stuffed with threats such as 'You must attend the lecture!' and 'You must not be late to class or I will deduct your mark'. We tend to over impose force, regulations, and constraints on students to motivate learning. Such authoritarian measures, in my opinion, often are counterproductive in the long run. Students may obediently 'learn' to pass the exams, but as soon as they leave the university their learning habit may simply cease because learning was such an ordeal during their university years.

Therefore, I always try to treat my students as adults. I constantly remind them that one's actions

always bear consequences, and one has to learn to take into consideration the possible consequences when one acts. I allow students the chance to explore their own ways of learning and give them the chance to err or even fail as part of the pain of growing, as these processes are for the sake of their intellectual maturity in the future. If their actions lead them to deprived states, they learn the lesson the hard way so that they can appreciate from within what is ultimately the right thing to do for their own future. Essentially, my idea is to inseminate the realisation that when one understands the consequence of his/her actions, he/she will spontaneously, without being forced, initiate his/her own motivation to learn.

COOL LECTURER

In relation to this, designing effective and quality examination questions is an essential mechanism to discriminate those who have taken the initiative to learn from those who have not. I constantly tell the students that they are always free to do anything, but they will surely see the consequence in the exam hall. I do not penalise students for not attending my classes or not handing in assignments. Whether they choose to cut corners or to practice a down-to-earth learning attitude, the final exam grades judge them objectively. Those who choose a lazy path will suffer when they are unable to answer questions in the examination hall. Reward, on the other hand, will present itself in the form of a brain loaded with intellectual bliss (and an excellent grade) for those who choose to work towards their own success.

'No consultation hour policy'

I practice a 'no consultation hour policy', which means that I do not have a set time slot for consultation with students. Students are welcome to consult with me anywhere, anytime, using any means. I open as many channels as possible to maximise the chances that students will contact me. I tell students that they can see me personally in my office or communicate with me via email, SMS, or on the course forum. Currently, I do not use MSN messenger, Facebook, or Skype. Generally, any time a

student knocks on my door to ask questions, I give him/her priority, even if I am in the middle of my own work. As noble as the no consultation hour policy may sound, in reality I receive few requests from students for consultation. This is what I call 'the missing students after classes' phenomenon, and it reflects the sad state in which students do not nurture the habit of asking questions of their instructors, despite the doors being open to them. My personal thoughts about students and their passive attitude about asking questions are the following: (i) They do not know what to ask; (ii) they are too reserved to ask; (iii) they are too lazy to ask; (iv) they have been chronically intimidated by their teachers, so much so that they no longer dare to ask; and/or (v) they have no interest at all in their studies and therefore do not bother to ask. I also believe that a pop culture phenomenon among the students relates to this issue. A large portion of students (~60% or higher among male students, lesser for female students) spend excessively long hours on online gaming. Students have told me that 3 hours per day online is usual, and 10 hours per day during the weekend is nominal.

My strengths in teaching

According to Richard Feynman, my role model as a physicist and a physics teacher, if one really understands a physics theory well, one must be able to explain it well too. Otherwise, one does not understand. A person who knows his physics well may not be a good physics teacher, but to be a good physics teacher he/she must know his/her physics well. As far as teaching undergraduate physics is concerned, I think one of my stronger points is that I know my undergraduate level physics well and so I can ably explain it. I also have the spontaneous willingness to go the extra mile to deliver quality teaching, as evidenced by my many attempts using different teaching initiatives. These initiatives cost me a great deal of extra work and effort, so why did I bother with them? I did so because, like Feynman, I enjoy doing so. This unorthodox willingness to go above and beyond could be my greatest strength in teaching.

My weaknesses in teaching

In spite of the many initiatives I have tried to facilitate better teaching, there are still many things that I missed. My teaching style is still very much inclined towards an instructor-centred model, as I do not know how to teach using student-centred or problem-based approaches. I tend to dominate the talking portion of my lectures, but this is in part due to the poor response from the students (apart from the occasional SMS questions by students). I often have to arrange for extra classes because I exceed the time limit allocated, so much so that I have to sacrifice some non-lecture activities such as group presentations and small class tutorials.

I do not like to arrange for small class tutorial sessions because I have observed that the quality and effect of such classes conducted by junior tutors were mostly very poor. In previous tutorial classes, I have seen the students sit idly while the tutors mechanically copy solutions word-by-word onto the whiteboard without much explanation. Thus, no meaningful interactions occurred in these

sessions. To avoid wasting everyone's time on such an unproductive activity, I later replaced small class tutorial sessions with discussion of tutorial questions in the main lecture hall, where I facilitated the discussion. In this context I have deprived the students of the personal attention and interactions that would occur in a small class tutorial session. However, until I am convinced that the small class tutorials can be conducted in a more productive manner, students in my classes cannot enjoy personal attention and closer interactions with tutors in a small tutorial class.

Despite frequently condemning students for being overly exam orientated, I still rely quite heavily on examinations to evaluate the students. How am I to evaluate them objectively and efficiently (e.g., within a 3 hour time slot) if not through paper-based examination? I do know not of any other alternatives.

Another of my weaknesses is that I often make mistakes, including conceptual errors in the lecture notes, during the lectures, or even in the final examination questions. However, I learn from my mistakes and I improve over time. I try to be a humble person, apologise, and make fun of myself when I make these mistakes. Intentionally, I also want to show the students a role model who is an ordinary person who is sincere and can admit his weaknesses and still be able to learn and proceed beyond the mistakes made.

CONCLUSION

Overall, my observations indicate that the study culture among the School of Physics students at USM is not very commendable. Specifically, the students follow a chronic pattern of rote learning. There is little incentive, apart from personal motivation, for the lecturers to be creative in their teaching. Our education systems encourage rote learning and are very exam orientated. As a result, we produce a breed of students characterised by strong passivity and obedience. Teachers are a part of the problem because of their rigid and unfriendly teaching styles ('You must follow the instructions or you will be penalised…'). These factors add up to make teaching physics to undergraduate students at USM like a huge battle. Having said this, I do not aspire to be the hero to revolutionise our education system. I only do my part, which is within my capacity, such as implementing various initiatives as discussed earlier.

Apart from all of the philosophical and idealised talk about principles and values, at the pragmatic level, the key consideration to a successful classroom experience is simply to retain a student's interest, both inside and outside the classroom. To this end, I have to generate interest, appreciation, and comprehension of the subject matter within the hearts of the students. I have to prompt them to see the relevance of the theories in the books to the real world in which they live. All of this must be done in a tactful manner and in such a way that the students find the learning process fun and attractive so they want to stay to learn more. Optimising retention of interest and generating a love for the physics courses are the prime factors I consider when designing my teaching strategies. I enjoy the act of making others understand something that is otherwise incomprehensible. I feel a great deal of satisfaction when a novice student nods his head as if he is following my explanation.

I admire Richard Feynman and am particularly impressed by his character as a physics teacher [5]. He was able to make abstract ideas tangible and complicated matters become crystal clear. Feynman certainly was a master of elucidation and storytelling, skilfully using many tools to assist his explanations, including analogy, simile, humour, contrasting cases, contradictions, and, most importantly, daily language understood by ordinary people. His enthusiasm and ability to make his audience comprehend otherwise incomprehensible physics theories have inspired me to a great extent. Throughout my teaching career, I have gradually acquired some personal insight into the art of elucidation, thanks partly to Feynman. I try to make my lectures a quality learning experience for the students. Not every student would agree that I am a successful physics teacher (many still complain that they do not understand what I say in class), but I am quite confident that my physics class is among the less boring ones.

To many, it may seem incomprehensible that physics and mathematics are comprehensible. Therefore, I find it a pleasure to help people understand the seemingly incomprehensible. To me, the teaching of physics and mathematics is a source of creativity and liveliness and an enjoyable endeavour.

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CHAPTER 7

MY ASPIRATION TO BE A UNIVERSITY LECTURER

Yvonne Tze Fung Tan

Shortly after I registered as a Pharmacist in Wisconsin, USA, I joined Universiti Sains Malaysia (USM) as a lecturer in 1974. Even though I have a professional license overseas, my aspiration was to teach in a pharmacy school and educate young Malaysians to become responsible and professional pharmacists. In the 1970s, the student body was very small. There were only 19 students in the first class at the School of Pharmaceutical Sciences, USM. I only used chalk and the blackboard as my teaching tools. However, I emphasized group discussions a great deal, in addition to my formal lectures. By giving tutorial classes, I got to know my students better—the good, the mediocre, and also the weak ones. The frequent and close contact I had with my students in small groups helped to motivate them. During that time I knew all of my students by name and how they fared in my classes. In those early years, the number of academic staff members in the school was limited, and there were only a handful of us in the discipline of Pharmaceutical Technology. As such, I needed to teach new courses every semester. Those courses included Physical Pharmacy, Industrial Pharmacy, Dosage Design, and even Mathematics and Statistics for Pharmacy. Initially, I found teaching very taxing and stressful. Most of my office time was devoted to preparing lecture materials and practical manuals. However, those were also the years that trained me to continue to widen my knowledge, even if the subjects were new to me.

In the 2000s, the student body grew in size. To date, there are about 130 pharmacy students per year class. I now present all of my lectures using PowerPoint. This way, I am able to teach better with illustrations and simulations. Although the student number is much larger now, I still believe in the importance of tutorial classes and I continue to perform student assessments

in teaching. To accomplish this, I divide the students into groups and I conduct tutorial and practical classes three times a week.

In all of the courses that I currently teach, I assess the students using both continued assessments and the final examination. For the two pharmacy practice courses (Dosage Form I and Dosage Form II), continued assessment counts for 40% of the grade and the final examination counts for 60%. I used high continued assessment percentages for these courses because a well-trained pharmacist must have strong compounding and dispensing skills. In the beginning of the course, the students receive a deck of prescriptions containing typical examples of various dosage forms. Before the practical classes, I provide a detailed discussion of these prescriptions and dosage forms. On the day of the practical, the students prepare, compound, and dispense three of the discussed prescriptions in order to gain hands-on experience and master the compounding technique. In addition, the students are also given one extemporaneous prescription (a prescription on the spot without prior explanation) to test their actual application of the learned technique. Grades for the extemporaneous prescriptions contribute to their continued assessments. In general, continued assessments of the pharmacy practice courses consist of filling extemporaneous prescriptions, answering short quizzes, and taking a mid-semester test. Continued assessment provides students with opportunities to perform both in theory and in practice, to find out their own weaknesses, and to challenge them to improve themselves. All of the different components of continued assessments are marked promptly, and I provide feedback to the students during discussion sessions.

For the same courses, I also designed a computer program (Patient Information and Prescription Labeling Program) that can be used during the practical classes. I teach the students how to keep complete medication profiles for the patients, how to record drug information, and how to label the prescription medications according to Malaysian law. The computer-printed labels are clear and neat and thus eliminate the problem of non-legible scribbles when the labels are written by hand. The complete

medication profiles for patients are generated using the database of the medications. The computerized medication profiles facilitate accurate and fast retrieval of medication records and checking of drug interactions. This software operates using the SQL system and is designed to simulate real practice in community and hospital pharmacies.

The continued assessment for another course, Cosmetics and Toiletries, consists of a laboratory practical, a mid-semester test, and student projects/presentations. In this course, the students prepare various cosmetic products in the laboratory, and they are also divided into groups and given different projects. Each group conducts a detailed online search for its respective project and presents the findings via a PowerPoint presentation at the end of the semester. I request that all students in the class be present during the presentations. After each presentation, time is allocated for questions and answers. I believe that group project/presentation is a type of learning that fosters group effort and collaborative learning among the students. The students get to share their own ideas, increase their communication skills, sharpen their responses to criticisms, and broaden their understanding of the topic matters. My aim is to teach and inspire the students to become competent pharmacists in the future. Every year I find the student presentations to be very interesting, and I am amazed at how well the students perform and speak in public.

In 2008, I was nominated by my school for the USM Excellence in Teaching Award under the Applied Science Category. The nomination came as a big surprise, because to me educating with full commitment is the duty of every lecturer. In the past, I have received thank you cards and notes from students who wanted to express their appreciation for my guidance. In all cases, I have treasured these gifts and have them pinned on the board next to my work table; they are a constant reminder to me to be a committed academician. The letter that I received from a group of graduated pharmacy students who cared enough to write a letter of testimonial for me for the teaching award nomination really touched my heart. I fully believe that all of the effort I have put into teaching during my career has been worthwhile. To me, university teaching is not just a secure job, it is a platform for lecturers and students alike to share and discuss their knowledge and experiences, to build true friendship, to develop an attitude of life-long learning, and to become caring people who are ever ready to serve.

LOVEABLE LECTURER
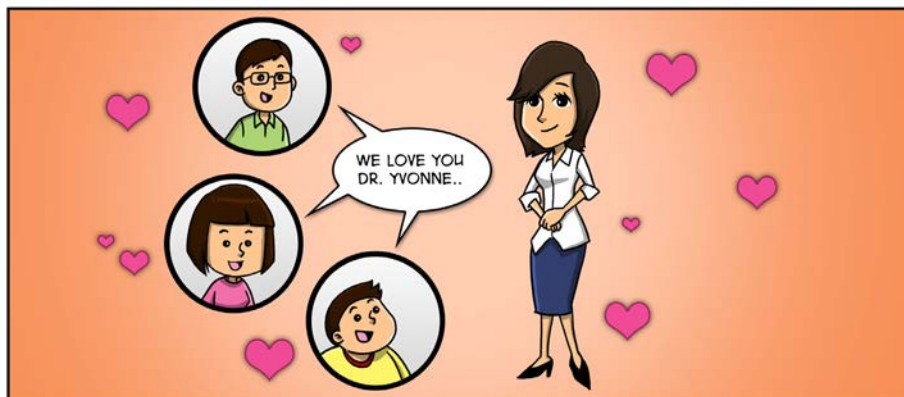
Dear Sir/Madam

<u>Letter of Testimonial: Associate Professor Dr. Yvonne Tze-Fung Tan</u>

This is to certify that we were Dr. Yvonne Tan's students from 2001 to 2005 at Universiti Sains Malaysia (USM) Penang, Malaysia. She taught us Mathematics and Statistics (Code: FMS161), Pharmacy Practice I and II (FTF 121 and FTF222), Physical Pharmacy I and II (FTF 221 and FTF 223) and Dosage Form Design.

Dr. Yvonne has always been the students' most respected and favourite lecturer. We still remember vividly her lecture on Prescription and Latin Abbreviation. She firstly introduced an overview of the topic and meticulously guided us into each subtopic, in her clear and captivating tone. Given that prescription is fundamental to the pharmacy profession, we were truly excited and inspired by her lecture.

In addition, Dr. Yvonne is very friendly and approachable. She would always indicate her whereabouts on her office door. All of us used to go to her office to discuss the tutorial questions with her. I once went to see Dr Yvonne for her advice, only to find out that she was about to leave her office with a visiting lecturer. Despite the fact that I did not make prior appointment with her, Dr Yvonne had insisted seeing me first, which clearly demonstrated that she always gives priority to her students. She took great pain to assess our laboratory reports, quizzes held weekly, as well as the physical pharmaceutical preparation, which we have benefited a lot from, thus able to improve our experiments. Her sincere efforts are hence clearly evident.

After graduating in 2005 I served as clinical pharmacist in Penang Hospital. In September this year I received a request for a type of suppository which was not available in my hospital. Inspired by Dr. Yvonne's practical lesson in suppository formulation, I called to consult her idea to produce our own suppository. Without much hesitation she agreed to help by offering me to use the laboratory and guiding me through the preparation of the suppository. Clearly what set her apart from the rest is her persistent enthusiasm and endeavor to be an excellent lecturer, researcher and pharmacist.

In order to further impart her knowledge to the field of pharmaceutical technology, Dr. Yvonne devoted her time as founding committee and honorary secretary of Malaysian Society of Pharmaceutical Technology. In March 2008 she led the society

to hold the Malaysian Pharmaceutical Technology Scientific Conference which served as a common podium for academia, researchers, postgraduate students and industrial practitioners to share and discuss their findings and experiences pertaining to the recent advances in pharmaceutical technology. Well known as an expert in dosage form design and development with numerous international publications, Dr. Yvonne was appointed as academic advisor for Faculty of Pharmacy, Universiti Teknologi Mara and she sits on the Editorial Board for Malaysian Journal of Pharmaceutical Sciences.

We thus have no qualm in representing all USM Pharmacy students in unison, to recommend Dr. Yvonne as the **lecturer of the year** for Universiti Sains Malaysia.

Yours sincerely,

(LONG CHIAU MING)
Lecturer, Universiti Teknologi MARA, Shah Alam
(Bachelor of Pharmacy USM 2005 Graduate)

Advocates:

(LEE HOOI PIN , 2003)   (KHOO PEI SEE , 2007)   (LIM SHIAO HUI, 2007)

(LAU OOI LENG , 2004)   (KEE PEK LIAN)   (SITI NORMAH BINTI HUSSIN)
                                                   1996 - 2000

(SARAH BT ABDUL
KARIM , 2002)

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