VIVEKANANDHA

COLLEGE OF ENGINEERING FOR WOMEN
(AUTONOMOUS)

Approved by AICTE, New Delhi | Affiliated to Anna University, Chennai
NAAC Accredited – A++ Grade | NBA Accredited – CSE, EEE, ECE, IT & Biotech
ISO 9001:2015 Certified

TIRUCHENGODE - 637 205. NAMAKKAL DIST.

FACULTY INDUCTION PROGRAMME

Organized by

INTERNAL QUALITY ASSURANCE CELL

31st August 2024

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REPORT

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INTERNAL QUALITY ASSURANCE CELL

"FACULTY INDUCTION PROGRAMME"

Date: 31.08.2024

INDEX

Director IQAC **PRINCIPAL**

REPORT

REPORT

Faculty Induction Programme was organized & conducted by Internal Quality Assurance Cell of Vivekanandha College of Engineering for Women (Autonomous) on 31st August 2024 for newly joined faculty members.

The programme was started with the welcome address given by Dr.C.Uthayakumar, Director IQAC.

Session I was handled by Prof.Dr.S.Kuppuswami, Executive Director on "Communication Skills, Mode and Knowledge Dissemination".

Session II was handled by Dr.KCK.Vijayakumar, Principal on "The Art of Being a Brilliant Teacher".

Session III was handled by Dr.S.R.Kannan, HoD/S&H on "Human Values".

Session IV was handled by Dr.C.Poongodi, HoD/CSE on "Technology Enabled Learning and Life-long Self-learning".

Session V was handled by Dr.M.Sayeekumar, HoD/CST on "Moodle & LMS Platform".

Session VI was handled by Dr.C.Uthayakumar, Director IQAC on "Instructional Planning and Delivery (OBE)".

The Faculty Members gave their feedback about the programme and thus the programme ended successfully with the vote of thanks given by Mr.D.Santhoshkumar, Deputy Coordinator/IQAC.

APPROVAL LETTER

VIVEKANANDHA COLLEGE OF ENGINEERING FOR WOMEN
(Autonomous)
Tiruchengode, Namakkal – 637205.

Date: 27.08.2024

Submitted to the Principal for kind approval:

Internal Quality Assurance Cell (IQAC) is organizing a one day Faculty Induction Programme to newly joined faculty members on 31.08.2024 (Saturday) in Main Seminar Hall. In this regard, we request you to grant necessary approval.

The details of faculty members are attached for your kind reference.

Director IQAC

Remarks

PRINCIPAL

VIVEKANANDHA COLLEGE OF ENGINEERING FOR WOMEN
(Autonomous)
Tiruchengode, Namakkal – 637205.

Date: 27.08.2024

Submitted to the Principal for kind approval:

This is to kind information that, Internal Quality Assurance Cell (IQAC) is organizing a one day Faculty Induction Programme to newly joined faculty members on 31.08.2024 (Saturday) in Main Seminar Hall. In this regard, we kindly request you to grant permission to arrange refreshment for the participants.

S.No.	Date	Refreshment	Quantity
1	31.08.2024	Tea and Biscuit	FN - 45 AN - 45

Hence we request you to grant necessary approval.

Director IQAC

Remarks

PRINCIPAL

AGENDA

VIVEKANANDHA COLLEGE OF ENGINEERING FOR WOMEN
(Autonomous)
Tiruchengode, Namakkal – 637205.

Date: 27.08.2024

INTERNAL QUALITY ASSURANCE CELL

Faculty Induction Programme

AGENDA

Date: 31.08.2024 Venue: Main Seminar Hall

S.No.	Session	Topic	Resource Person
1	09.45 - 10.30 AM	Communication Skills, Modes and Knowledge Dissemination	Dr.S.Kuppuswami, Executive Director
2	10.30 - 11.15 AM	The Art of Being a Brilliant Teacher	Dr.KCK.Vijayakumar, Principal
3	11.15 – 11.30 AM	Tea Break	
4	11.30 - 12.15 PM	Human Values	Dr.S.R.Kannan, HoD/S&H
5	12.15 – 01.00 PM	Technology Enabled Learning and Life-long Self-learning	Dr.C.Poongodi, HoD/CSE
6	01.00 – 01.45 PM	Lunch	
7	01.45 - 02.45 PM	Moodle & LMS Platform	Dr.M.Sayeekumar, HoD/CST
8	02.45 - 03.30 PM	Instructional Planning and Delivery (OBE)	Dr.C.Uthayakumar, Director IQAC
9	03.30 – 3.45 PM	Tea Break	
10	03.45 PM	Feedback Session	

Director IQAC

PRINCIPAL

Agenda

S.No	Session	Topic	Resource Person
1.	09.40 AM.	Welcome Address	Dr.KCK.Vijayakumar, Principal
2.	09.45 - 10.30 AM.	Communication Skills, Modes and Knowledge Dissemination	Dr.S.Kuppuswami, Executive Director
3.	10.30- 11.15 AM.	The Art of Being a Brilliant Teacher	Dr.KCK.Vijayakumar, Principal
4.	11.15- 11.30 AM.	Tea Break	
5.	11.30- 12.15 PM.	Human Values	Dr.S.R.Kannan, HoD/S&H
6.	12.15- 01.00 PM.	Technology Enabled Learning and Life-Long Self-Learning	Dr.C.Poongodi, HoD/CSE
7.	01.00- 01.45 PM.	Lunch	
8.	01.45- 02.45 PM.	Moodle & LMS Platform	Dr.M.Sayeekumar, HoD/CST
9.	02.45- 03.30 PM.	Instructional Planning and Delivery (OBE)	Dr.C.Uthayakumar, Director IQAC
10.	03.30- 03.45 PM.	Tea Break	
11.	03.45 PM.	Feedback Session	
12.	03.50 PM.	Vote of Thanks	Dr.C.Uthayakumar, Director IQAC

VIVEKANANDHA

COLLEGE OF ENGINEERING FOR WOMEN

[Autonomous]

Estd. 2001

A++ NAAC

Prof. Dr. M. Karunanithi
CHAIRMAN & SECRETARY

Internal Quality Assurance Cell

Cordially Invite you for

Faculty Induction Programme

on 31st August 2024 @ 9.45 AM. to 04.00 PM

AICTE IDEA Lab

Resource Persons

Dr.S.Kuppuswami,
Executive Director

Dr.KCK.Vijayakumar,
Principal

Dr.C.Uthayakumar,
Director IQAC

Dr.C.Poongodi,
HoD/CSE

Dr.M.Sayeekumar,
HoD/CST

Dr.S.R.Kannan,
HoD/S&H

PRESENTATION DETAILS

SESSION I

"COMMUNICATION SKILLS, MODES AND KNOWLEDGE DISSEMINATION"

by

Prof.Dr.S.KUPPUSWAMI

Executive Director

Vivekanandha Educational Institutions

SESSION II

"THE ART OF BEING A BRILLIANT TEACHER"

by

Dr.KCK.VIJAYAKUMAR

Principal

Vivekanandha College of Engineering for Women

SESSION III

"HUMAN VALUES"

by

Dr.S.R.KANNAN

HoD/S&H

Vivekanandha College of Engineering for Women

SESSION IV

"TECHNOLOGY ENABLED LEARNING AND LIFE-LONG SELF-LEARNING"

by

Dr.C.POONGODI

HoD/CSE

Vivekanandha College of Engineering for Women

SESSION V

“MOODLE & LMS PLATFORM”

by

Dr.M.SAYEEKUMAR

HoD/CST

Vivekanandha College of Engineering for Women

SESSION VI

"INSTRUCTIONAL PLANNING AND DELIVERY (OBE)"

by

Dr.C.UTHAYAKUMAR

Director/IQAC

Vivekanandha College of Engineering for Women

ACTIVITY SESSION

Brilliance Builders.

8

Teacher Lessons

Lilavati Krishnan
Psychology

This essay is not meant to be a 'How to...' recipe. The author will not be sharing any professional 'secrets', or any foolproof 'tips for effective teaching'. Instead, these few pages are going to be a walk down the memory lane of a teacher who has spent about 36 years in the business, and never wants to get out of it. This is a narration by a teacher, of some lessons she has learned, cut-and-pasted from her past experiences, as a student, as a teacher, and as a teacher-student. I request the pleasure of the reader's company to join me in this walk, and share these experiences.

When I look back more than three decades ago, I can see myself standing on three hillocks; the first and smallest one helped me to step up to the second one which was bigger, and the second one, in turn, hauled me up quite effortlessly to the third one – on which I stand now, surveying the world around me. With each climb I learned a few lessons, which added to my perceptions which themselves were formed out of the innumerable lessons my parents and teachers had taught me over the years. Even though I am professionally a teacher, I can proudly say that I have learned, and continue to learn, much more than I have taught.

September 1969. I was going to join my first job, and that was as a lecturer in Psychology in a women's college. Was I nervous? No—I was too ignorant about what awaited me to even feel worried. As soon as I had given my joining report, I went to see the college library, and to find out what books they had on the subject. I was the first faculty in the Psychology department, and I knew I would have to start the task of building everything, from scratch: I was going to be both the Head and the tail of this department for some years. And then I faced reality—there were about ten skinny books on Psychology, all in Hindi, and all consisting of pieced-together paraphrases of translations from well-known English textbooks. There would be no money to buy new books in the next six months or so. The only new element I foresaw was that I would have to teach in Hindi, and get used to reading technical books in the language. No problem, I told myself. After all, I do speak Hindi very fluently. I would use the English material that I was so familiar with, and organize it in my own way for each lecture. There is always a first time for everything, is there not? My very first lesson is: A teacher has to be prepared for any eventuality, and to make do with the minimum of facilities, without complaining.

A teacher has to be prepared for any eventuality, and to make do with the minimum of facilities, without complaining

In my first lecture, about a hundred eager faces of 16 to17-year-old girls greeted me—eager, not so much to find out about the subject they had to study, but more to see what kind of person their 'Psychology Madam' was. And this is what they must have found: a young person just out of college who meant business, reminding them that Psychology is undoubtedly an extremely interesting subject, but it will mean hard work, and so on. The first 45-minute encounter taught me many things, and left me with several questions, related to the procedure or 'mechanics' of teaching. I had covered so little ground—was that all I could cover in one lecture? Should I have gone faster? Was I repeating myself? But if I said something only once, how could I make sure that every student has understood it (I was a student myself, until just a few months ago). Was I speaking too fast? How would they listen to me and take notes at the same time? Did these girls

even know that they would have to take down something called 'notes'? Did they know *how* to take notes? They were just out of school, where everything was given to them—but then, nobody had ever taught me to take notes either, and I still learned on my own. Would these girls continue to come to class with the same enthusiasm? Was their enthusiasm my responsibility as a teacher, or theirs?

By the end of one month, I settled down into teaching. At the end of my lectures everyday, I found myself looking forward to the lectures of the next day. Countless times I would spontaneously recall the numerous subtle aspects of communication, those micro-skills, passed on to me very indirectly by my teachers and parents. I kept in front of me the examples of the most effective speakers I had always admired, taking inspiration from them, but never trying to imitate them. My second lesson is: Being a teacher is not a matter of following a set of rules that everyone must follow; instead, a teacher should get a taste of his or her unique personality, because there is something special about every single teacher that is not found in anyone else.

Being a teacher is not a matter of following a set of rules but about tapping something special in oneself as a teacher

By the end of the year, I was sure that teaching was indeed the profession most appropriate for me, and that I was very fortunate to be in this profession, albeit in the environs of a small government college that did not provide any special facilities worth the name. In general, I had an easy life. College and university teachers were supposed to teach a syllabus given by the university Board of Studies—no more, and no less (although sometimes the latter would be tolerated). Most students went through the motions of studying: 'learning' to them meant getting good marks in their final examinations. The concept of evaluation by students was non-existent in this system. It did not matter much to them that a teacher was quite keen to teach them something in addition to the syllabus, perhaps following an innovative technique. While this kind of life would be considered 'cool', there was hardly any challenge for the teacher. Yet the interaction with students was rewarding. Some of them were actually interested

in learning beyond getting marks. I found that the students' response to a teacher's warmth was synonymous with 'evaluation'.

My third lesson is: A teacher who is more motivated than the students may feel disheartened. It does not matter, Teacher. Try to interact with the students as they are, not as you wish they would be. Warmth, and 'unconditional regard' in Carl Rogers' words, can go a long way, and are the foundation of communicating effectively. As a student I learned most from the warmest teachers. I also learned that much of the students' response or reaction is a direct function of what the teacher conveys.

Try to interact with the students as they are, not as you wish they should be

Even in this first phase of my professional life, I came across cynics who spared no efforts to dampen my zeal. "Why do you work so hard? You are not going to get the Rashtrapati's medal, no matter what you achieve!"—this was a comment from one of the senior teachers in the college. I felt sad, but much to her disappointment, I did not mend my ways. I had never thought of the possibility that people can teach in order to get some award or honor. It did not take me long to learn that a teacher gets natural and immense enjoyment by teaching just for the sake of teaching (just as students get the maximum by learning for the sake of learning). How right this unknown author is when he or she says: "The best teachers teach from the heart, not from the book"! So, My fourth lesson is: So, Teacher, if things do not seem to be going right, begin by examining yourself rather than the students. Are you teaching from your heart?

If things do not seem to be going right, ask yourself if you are teaching from your heart

That was one experience. The next one was a jump. Four years later, I had suddenly climbed up the first hillock on to the second one, as a teaching assistant in a Canadian university where I was doing my doctoral studies. This was a very different socio-cultural environment. Each of us was required to run an independent tutorial group (of about 25 students), as part of a course in which

the enrolment was more than two hundred. We had been explicitly told that this tutorial group was meant to be more than a session for clarification of questions from the lecture content. As teaching assistants (TAs) we had to be prepared to clarify the students' questions, of course, but our main task was to conduct our own discussion sessions, to give term papers and grade them on our own. That meant reading a lot: technical literature, journal articles, and any other suitable material that one could read, analyze, and discuss.

Moreover, I was in a culture in which students are socialized to ask questions endlessly, to democratically respect (but not necessarily revere) this person called a 'teacher' or 'tutor', and to be entitled to an explanation for every mark and every comment from their T.A. The students were also very generous with personal criticism, justified or unjustified. For the first time in my life, I had to learn to take criticism even if it was cruel and unfair. And for the first time, I had to face evaluation by students.

I also remember that before the tutorial sessions, I had a constant fear of not knowing enough. "No matter what", remarked my research supervisor, before the semester began, "always remember this: as a Ph.D student you definitely know more than the undergrads you will deal with in your tutorials." True: but does lack of information imply worthlessness? Does being a teacher or tutor mean that we have lost our liberty to be ignorant, wrong, or to make errors, once in a while? To be human in other words? I answered all these questions in my own way.

My fifth lesson is: I've learned that nobody—not even the best teacher—knows everything, so learn as you teach, not just from the books, but from the students, regardless of whether you know more or less than them. "He who knows not, and knows he knows not—he is a child: teach him", the saying goes. Irrespective of experience, a teacher will never have the luxury of going unprepared for any class or lecture. Moreover, a true teacher never really looks for a concrete, external reward, or praise (although it does feel good when praise comes). The real test for a teacher is how he or she reacts to criticism.

Nobody – not even the best teacher – knows everything. So one must learn as one teaches

Very soon, I learned that being a T.A. can be a delightful experience—full of challenge, on the one hand, because it tests your presence of mind, creativity as well as management skills (of sorts), but also very satisfying, on the other, because you see some faces at least that will tacitly say—"Thanks—now I have understood something that was not completely clear during the lectures. I have learned something".

There is an interpersonal facet, too, that cannot be ignored. As a T.A. (and also later on) I am sure I made some enemies. Like that student who got a low grade from me on her term-paper because her paper lacked analysis. Or the other student who protested when his plagiarism was detected. But I also made some friends, who kept in touch with me even after finishing the course, visited me at home, and shared with me their good and bad times.

I learned that a teacher may be in a position of authority, but does not have to stand on a pedestal 'talking down' to students: he or she can certainly stand level with the latter.

About nine years after my entry into the profession, I climbed up to the third hillock, on top of which I stand now. There were some things I did not have that many other teachers had. For example, I had no firsthand experience of dealing with indiscipline in class. I had never attended any workshop of any kind on 'teaching techniques' or 'communication skills', or taken any training in a degree-oriented Bachelor or Master of Education program. Nor did I have any formal experience of dealing with problem students. I do not recall ever having seriously applied some of the ideas I had been taught in my Educational Psychology course. My only strong point was my intense love of teaching as a profession, and of interacting with young minds eager to learn.

A teacher's strong point is her intense love of teaching and interacting with young, eager minds

At that stage I got the very valuable opportunity to join the faculty of a prestigious institute of technology, and in fact, currently rated the best among the Indian Institutes of Technology—IIT Kanpur. I loved the place, its library,

its open spaces and even more, its open minds. Most of the people were friendly and informal, although they seemed to be busy all the time.

Then I went for my first lecture. I could immediately empathize with Androcles facing the lion. Here were a group of extremely bright students, who were not specializing in the subject I was teaching, and yet had all kinds of questions. They wanted answers right away. Woe to any instructor who even thought of going to a lecture without sufficient preparation. Were the students testing me or putting me on trial? Suddenly, I did not feel so very confident, after all. I had tasted something similar as a graduate student outside the country, but this was quite different. Androcles had to face only one lion, but here, a faculty had to face many—and come back the next day, ready to be mangled again.

I think I was fortunate. With every lecture I found myself becoming more energetic, and feeling happy that I was interacting with lions instead of passive rabbits. This was not because I 'knew more than them' as my professor had advised us some years ago, but because I was willing to learn whatever I did not know well enough. Even when I did come quite close to being gobbled once in a while, that experience generated a spirit of challenge rather than frustration.

My sixth lesson is: So this is what teaching means—a process very close to what social psychologists call 'self-monitoring', but with the right motive. Teacher, listen carefully to your own lecture as you give it, observe yourself as you appear to the students, watch hawk-eyed for the reactions in students—how much have they understood? Have you communicated what you should have? Look at the blank faces—do you read 'slow down, ple-e-ase!!'? All right, make the changes that are required. Do you still see the same reactions, or do the students appear more comfortable? Can you continue lecturing? Stop and ask—are they 'with you'? You will see hands going up—can you anticipate the questions they will ask? If you can, chances are high that you are already prepared to answer those questions.

Listen carefully to your own lecture as you give it and observe hawk-eyed how much your students have understood

Is this process stressful? Not if one is unconcerned about concrete rewards at the end of it. Not if one can make all this 'second nature'. Is it artificial? Yes, for some of us, but not at all for many others, whose main aim is to do a good job of teaching. One's motive as a teacher may be to appear scholarly and intelligent, to make a good impression, so that one gets a good rating from the students, so that one can climb up the promotion ladder more easily, et cetera. Or, one's motive as a teacher may be simply to do the best job one can, of conveying information (knowledge?), or even to see how well one has understood the material oneself—without even remotely thinking about an external reward. If you belong to the latter group, there will be no artificiality. Try out the process described above, Teacher—and then see how much you enjoy the whole experience.

My seventh lesson is: When students recognize a willing and motivated teacher, they will devour, not the teacher, but what the teacher says. The more analytical arguments they have, and the more difficult questions they pose, the more the teacher should feel complimented, because challenges are posed only to those who are ready to face them. Such an environment is wonderful if a teacher wants to see alternative ways of viewing an issue or idea.

When students recognize a willing and motivated teacher, they participate in the learning process whole-heartedly

That was it—I really loved teaching now, more than ever before. Along with this realization of my own deep love for the profession came another one: I had the daunting task of teaching, and dealing interpersonally with, very bright students. IITians may not always be interested in the subject, but they are intelligent. Often, they may have better ideas than their teacher: Should this be a source of an 'ego problem' for the teacher, or should this urge a teacher to give the students his or her very best? There were occasions when, in a quiz or examination, an answer that I considered incorrect was seen to be correct by the majority of the class. They gave arguments for their stand. There were times when I had to acknowledge my own mistakes, and to take remedial action. What

Admit your mistake without 'loss of face', and correct it

about "loss of face"?, some might ask. Well, to me admitting a mistake is less of a 'loss of face' than living with a falsehood.

Occasionally, after a lecture, a very enthusiastic student would come up to me with a diagram in his notebook: he would proudly show me a 'model' of some cognitive process that we had been discussing in class. Should I praise this student for having shown independent thinking, or should I point out the horrendous errors in his 'model'? I distinctly remember being happy at having students who were interested enough to express new ideas: the errors could be somehow corrected. Killing a student's well-placed and genuine enthusiasm is a crime that a teacher must avoid committing. What about those students who are not so bright, and who have problems with English, the medium of instruction? I recall some students who were thrilled to discover that I could explain things to them in individual sessions in my office, in Hindi. The extra time spent on them was worth it.

Encourage a student who is enthusiastic and help one who has problems

Then there are those small experiences that have left a mark. Once, after I had gone through the correct answers in a multiple-choice quiz, a student who had checked two alternatives in one of the items, came up to me and asked me to give him one more mark. He explained that he had actually made one check-mark darker than the other, but that I had not noticed it. On my part, although I intuitively felt that the student may be right, somehow I did not think it would be fair at this stage to change the mark (since I had already told the class the correct answers). So I said to the student: "Look, I believe you, but you should have pointed this out before I gave out the correct answers. Now it would be unfair on my part if I give you credit for this item." I expected the student to express dissatisfaction. Instead, he responded with a relieved smile: "Thank you very much, Ma'am. You said that you believe me, and that is enough for me." Some might say that the student was deliberately putting on the act of being 'good', to impress me. Perhaps, but I do not rule out the possibility that the student was indeed relieved to be told I believed him.

Of course, one comes across pretenders and manipulators as well. There have been situations when as a teacher I have been harsh. I have had no regrets because those students deserve reprimands, and my harshness has not diminished my respect for them as individuals. Does such behaviour make a teacher appear less 'warm' and approachable? There are no direct answers to this question. Once again, on all such occasions, I remembered my own teachers, and all the values they had passed on to me. I also remembered my parents who quietly inculcated in me the spirit of doing my best in everything I undertook, with utter sincerity and honesty. The question of cutting corners, or being knowingly unfair, simply does not arise, no matter what the task and what the circumstances.

Trust students but do not fight shy of reprimanding those who deserve it

In the last twenty-seven years or so, the informal 'feedback' I have received about myself contains one consistent theme: I am a 'strict' teacher, a hard taskmaster, and students are 'afraid' of me. In the beginning, this made me worried: Why are the students afraid of me? Is it because they think I do not give them high marks? Because I persuade them to work hard? Because I insist on punctuality, discipline and honesty? Because I am uncompromising in terms of the quality of work? But soon I realized that this kind of reputation meant either that, in fact, I do have certain personal qualities that put off students, or that the 'fear' is an expression of respect. Should I change myself? Would that be possible for me? What kind of message would that convey to students? Would I be fulfilling my responsibility or respecting myself, if I started giving 'easy' grades to my students, or become lackadaisical in teaching?

This reminds me of a meaningful statement by a famous psychiatrist, Karl Menninger who has said: "What the teacher is, is more important than what he teaches." An incident stands out in my memory even today. A few years ago, a professor in another department—a great believer in good teaching, and a very warm, likeable human being—once told me what some of my students had told him, while expressing gratitude towards me: "She is never satisfied with what we do". The professor emphasized that the students, in fact, had meant this as a compliment.

I hope the professor was right in his judgment about the students. It was only after some time that the intensity of this otherwise small statement struck me: how far can a student climb if the teacher sets low goals, to begin with, and becomes easily satisfied with the student's performance? With the kind of bright students that I had, I would be short-changing them if I did not demand their best from them. In this context, I cannot help quoting one of my favourite statements (possibly meant to be humorous) from 'Murphy's Law': *The only way to discover the limits of the possible is to go beyond them into the impossible.*

My eighth lesson is: Setting easy, low-level goals for students should be a punishable offence for teachers, as this is undignified for both the teacher and the students. A teacher who pushes the students to the limit of their potential may be temporarily criticized and may incur their displeasure, but in the long run, will succeed in bringing out the best, the latent and the untapped, in the students. However, such 'pushing' has to be done in order to let the student grow on his or her own, and discover his or her own potential, and not with the aim of moulding or influencing the taught. The metaphor of the potter giving shape to clay is one that has never appealed to me in the context of a teacher-student relationship.

Setting easy, low-level goals for students should be a punishable offence for teachers

What about colleagues? I keep meeting cynics, faculty who think it is unwise to spend time on teaching-related activities instead of ones that would yield more 'visible' outcomes, such as published research papers. I have come across dampers such as: "Those who can, do. Those who cannot, teach." (George Bernard Shaw). But I have also met colleagues who, about two decades ago, were students in my class! ("Professor, I was your student in this course in 1981—I enjoyed it, and thank you for teaching me!")

For some reason, such experiences have never made me change my views or ways of teaching. The only consideration is whether I am doing justice to my students and to my profession. In all these years, I continue to be the person I always was—without any intention to influence or change students, or to be an example to them.

Now I often have to participate in committees that select teachers, and to tacitly answer two questions: "Can teachers be 'made'"? "Who is a good teacher?" As far as the first question is concerned, there are those who believe good teachers can indeed be 'made', but there are others like Peter Drucker, who believe that being a good teacher is an intrinsic quality: "Teaching is the only major occupation of man for which we have not yet developed tools that make an average person capable of competence and performance. In teaching we rely on the 'naturals,' the ones who somehow know how to teach." I tend to agree with Drucker. The 'naturals' of course have to be nurtured by giving them the proper environment.

Can teachers be made?

With regard to the second question, "Who is a good teacher?" views differ widely. The mundane view (probably the most common one) is that technical expertise in the subject, along with good communication skills is necessary. But are these qualities *sufficient*? 'Awards and honours' are seen as added qualifications, but what do they really '*add*' to a teacher? Experience and training are considered important in some areas, but exactly what do teachers get *trained* for? Why is there no mention of 'character', in the wide sense of the term? Perhaps this is because it is almost impossible to judge 'character'.

Views about "Who is a good teacher?" differ widely

It is said that a teacher today should be a mentor, a facilitator and guide to students. Traditional Indian thinking makes a distinction between a *shikshak*, an *acharya*, and a *guru*. Most of us as teachers are happy to be *shikshaks*, at best. Some graduate to the level of being perceived as *acharyas*. Very few rise to the level of being seen as *gurus*, as ones who remove darkness and bring enlightenment to those desirous of learning. Possibly it is the element of character that distinguishes between the teacher or *shikshak*, on one hand, and a mentor, facilitator and guide, *acharya* and *guru*, on the other. As William Arthur Ward has said:

"The mediocre teacher tells. The good teacher explains. The superior teacher demonstrates. The great teacher inspires."

My life continues to carry the spirit of all these lessons that I have learned, to go through intense soul-searching after analyzing the countless mistakes I think I continue to commit, and the pain I have to sometimes endure, to give to students as much as possible but never to take from them. The only wish in my professional life is to give my best as a teacher and human being. Whether or not it is appreciated and valued by others does not really matter.

Finally, my ninth lesson: With a deep sense of gratitude to all my elders and my students, who have made me feel like this today—Teacher, you will always be a student and learner. For those who think a teacher's life is colorless and tasteless, the message is, please think again. This can be one of the most stimulating and satisfying professions. "Only those who can, teach and learn." Happiness is, indeed, being a teacher.

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Team : Education Elevators.

9

A Commitment to Excellence

Suresh Kanekar
Social Psychology

Several decades ago, I read about a prestigious international school, probably somewhere in Scotland, whose motto was: "We strive for perfection, and settle for excellence." I have often quoted this motto in my class, almost invariably with an accompanying acerbic, albeit hyperbolic, comment to the effect that what we often see around us in India seems to be inspired by the motto: "We strive for mediocrity, and settle for stupidity."

Teaching is done at various levels, from pre-nursery through post-doctoral. My personal experience is limited to a little high school teaching, more of undergraduate teaching, and mostly graduate-level teaching, the last involving students working toward master's and doctoral degrees. As expectations from and requirements of teachers at the different levels are obviously not the same, I would like to stipulate here that my focus is on the teaching of graduate students, where the word "mentoring" probably is more appropriate than "teaching." Mentoring goes much farther than the mere imparting of information and skills; it includes caring for the professional development and personal growth of one's students. A

Teaching and mentoring

mentor not only instructs, but also motivates, stimulates, and at best inspires students in all spheres of life, even beyond the confines of academia. While direct mentoring is likely to be most effective in a one-on-one relationship, indirect mentoring can reach larger numbers of students through example and exhortation. A good teacher must be an excellent role model who can set up standards in scholarship and conduct for emulation by the younger generation.

In the higher educational echelons, teachers have a dual occupation, that of an instructor and also that of a researcher, the former communicating knowledge and the latter striving to push back the frontiers of knowledge. There is some controversy about the relative importance of these two functions of the university teacher. Often students of research-oriented universities complain that their teachers do not have time for them, because they are more interested in their own research. I personally believe that the function of creating knowledge is much more important than the mere imparting of knowledge. I would even admit that if I were forced to choose between teaching and research, I would without hesitation choose the latter. On the other hand, I am not particularly sanguine about belonging to an institution wholly dedicated to research, where there are no students to steal some of the researcher's time away from research. A young mind, brimming with curiosity, wonder, and questioning, can stimulate as well as invigorate more determined and sustained efforts toward conceptual cleansing and intellectual integrity. Most important, the roles of teacher and researcher seem to meld seamlessly during tête-à-têtes with doctoral students.

Teachers today are expected to teach as well as to research

I have often learned more as I was teaching than when I was studying a subject, because when one is teaching one has to be quite clear as to what one is saying and be prepared to justify one's affirmations, which of course entails a dependable as well as comfortable understanding of the subject matter. One has to be able to explain to oneself satisfactorily what one is going to explain to others. For example, I love to teach statistics, which many students find somewhat formidable to grasp. Because I had trouble understanding what my teachers of statistics were saying, I thought it could be taught better. Even though my specialization is not statistics—it happens to be social psychology—I thought I would teach statistics as a challenge for a teacher with half the students in the class sitting petrified with bemused, befuddled, or blanched faces. My teaching of statistics revealed a number of gaps in my knowledge of statistics, which I had to fill in, and naturally my understanding of statistics improved dramatically, with the ancillary facilitation of my research endeavors to boot. This would not have happened if I had not taken up the hardly coveted responsibility of teaching statistics. In a sense, the quickest way to learn a thing is to have to teach it, somewhat like the man in Samuel Johnson's piquant observation, whose mind is wonderfully concentrated when faced with the prospect of hanging.

Teachers truly learn a subject while teaching it because they have to be very clear while explaining it

While teaching statistics, I learned to be very patient with students who were not quick enough to understand what was going on in the class. I encourage questions in my classes, sometimes with the injunction that students should ask questions even though they might suspect the questions are stupid, for the simple reason that they would not learn if they did not ask questions. I have sometimes said that they could stop me in mid-sentence if they did not understand something I was saying. Sometimes in my enthusiasm I speak very fast, which can of course be detrimental to my auditors' understanding. So I tell my students the best way to slow me down is to ask me to clarify, elaborate, or even repeat myself, which I am prepared to do as often as it takes. Occasionally I have made an observation in my class that the absence of questions suggests one of two things: Either what I taught was perfectly lucid or it was irredeemably incomprehensible.

This reminds me of an anecdote about the great philosopher Ludwig Wittgenstein who sat in the class of G. E. Moore at Cambridge University. Wittgenstein had come to Cambridge to study the philosophy of mathematics under Bertrand Russell. On one occasion Russell asked Moore if the latter thought Wittgenstein was a bright student. Moore thought for a while and said he did. When Russell asked on what grounds Moore thought so, Moore said that he was the only student in his class who would look puzzled when Moore was lecturing. After his retirement and replacement by Wittgenstein, Moore sat in the latter's class and took careful notes, thus spectacularly reversing the student-professor

relationship. Education can be a joyous and thrilling ride when imbued with camaraderie, candor, and collaboration, such as practically make the distinction between student and teacher vanish in thin air.

It is the "puzzled" students who keep their teachers on their toes. But surprisingly there are teachers who do not like puzzled students. I was once told by a student of philosophy at the University of Poona that when he asked a question, the teacher asked back petulantly as to why he wanted to know that. He replied that he had a passion to know, and she came up with the *non sequitur* rejoinder that "You should control your passions."

It is the "puzzled" students who keep their teachers on their toes

In order to be a successful teacher one must have a passion to know, more prosaically the need for cognition as measured by Cacioppo and Petty's (1982) scale, a passion which is strong and contagious enough to rub off on receptive students. When one finds such passion in students, it must be nurtured, not allowed to wither. It is perhaps the most potent stimulus for the advancement of the human civilization. Young minds must be encouraged to question, debate, and even challenge what the teacher is saying. A good teacher cannot afford to be defensive. Questions or comments from students are not always wholesome, and they are not always aimed at clarification or enhancement of understanding. There are all kinds of students, some of whom might be merely trying to impress other students or be offensive to the teacher. But however exasperating or irritating questions from students are, we have to be as civil and tolerant as humanly possible, and avoid the temptation of casting aspersions on the student's intelligence or character. Under no circumstances should a teacher humiliate a student and thus possibly stop him or her from participating ever again in class discussions.

In order to be a successful teacher one must have a passion to know

I would like to present a case study from personal experience, which exemplifies both good and bad teaching practices. The most charismatic teacher I have ever had in my scholastic career was Gustav Bergmann, who came to the U.S. in 1938 as a Viennese refugee from Nazism. He had been one of the younger members of the Vienna Circle, whose logical positivism flourished in the 1920s under the leadership of Moritz Schlick and the inspiration from Wittgenstein's linguistic philosophy. Bergmann had a doctorate in mathematics, and wound up finally as a professor of philosophy and a professor of psychology at the University of Iowa, in Iowa City, having offices in the psychology as well as philosophy buildings. His office in the psychology department was not very far from mine, and we sometimes met in the men's room and traded pleasantries. I was very eagerly waiting to take his course on The History and Systems of Psychology, which was famous in the Midwest, so much so that professors wanted to attend his course, and he would generally refuse to allow them to do so. My doctoral supervisor, Milton Rosenbaum, told me that he was refused permission to attend Bergmann's course.

I heard many anecdotes about Bergmann, some probably apocryphal, especially the ones having to do with his association with Albert Einstein. Kurt Lewin, another Jewish refugee from Nazism and probably the greatest German psychologist to have had an impact on American social psychology, was working at the Iowa Child Welfare Research Station of the University of Iowa, and invited Bergmann to Iowa to mathematize his (Lewin's) topological psychology. According to the grapevine, Bergmann told Lewin that his mathematical psychology was nonsense, and promptly joined forces with Lewin's ideological nemesis, the behaviorist Kenneth Spence, with whom Bergmann collaborated on illuminating contributions to the philosophy of psychology as well as the philosophy of science.

I was worried that I might miss Bergmann's course because he was close to retirement, but I didn't. So with great expectations we were sitting in his class in the fall semester of 1969, and he said he didn't want anybody in his class who did not have an adequate background in either psychology or philosophy. He then summarily dismissed two or three students with the simple words, "Please leave," because they did not have the requisite background. Among other things he also said that while he would entertain questions, he would not hesitate to brush them aside—he made a sweeping motion with his arm here—if he found them irrelevant. He thus intimidated students into quiescence for some days, till

finally I broke the ice by asking the first question, which he did not brush aside as irrelevant. He was forceful and dynamic as a speaker, and his lectures were peppered with scintillating and luculent observations on psychological and philosophical theories as well as their proponents. He would come close to a student's face, vigorously nodding his head up and down, inviting assent, occasionally shooting spit from his mouth, all of which made it hazardous to sit in the front row, as was my normal wont in any class. I barricaded myself in the second row, with some empty chairs in front of me which made it difficult for him to get into my face. He often indulged in risqué innuendos, which some apparently found rather discomfiting. For example, hinting at his sexual decrepitude, he once said, "I used to say some years ago that I could bark, but not bite. But now I cannot even bark." But bark he certainly did. One of his notorious explanations for not allowing other professors in his class, which I had heard about before and then heard from the horse's mouth, was that teaching was like making love. "And would you have somebody else in your bedroom when you are making love to your wife?"

Bergmann appeared incapable of encouraging dissent. Although he and I were cordial to each other in the beginning, I was rather disenchanted by his authoritarian attitude. He was probably displeased by my stubborn refusal to nod my head approvingly and docilely (incidentally, "docile" literally means "teachable") when he obviously was seeking approval of his pronouncements. Thus our relations became a little bit strained, till to my immense surprise and delight I met him in the hallway after the final exam, which had consisted of a few essay-type questions, and he said, "I liked your paper." These were his exact words, and they are very precious to me, coming as they did from one of the finest intellects of the twentieth century.

Was Bergmann my ideal teacher? Of course not. He was brilliant and dedicated to his subject, so much so that he tended to inspire a similar dedication from his students. But he was dogmatic and domineering, almost an intellectual bully. His scholarship was exemplary. He is the only teacher from whose class notes I still (35 years after I took his course) retain a few pages—to remind me of such epigrammatic remarks as: "By 1925, every American psychologist was a

functionalist whether he knew it or not. By 1940, every American psychologist was a behaviorist whether he knew it or not."

Bergmann came from a German-Austrian tradition where Herr Professor was almost God. Kurt Lewin had Carl Stumpf as his doctoral supervisor at the University of Berlin. When Lewin went with his doctoral proposal to Stumpf, he did not get to see his professor. Herr Professor's assistant took the proposal from Lewin and carried it to Stumpf, and after some time came back to Lewin and told him that it was approved by Professor Stumpf. Lewin thus got the green signal, and went ahead and did his doctoral work without ever meeting Stumpf even once during the subsequent four years to discuss his doctoral work till the day of his final examination for the doctoral degree. Fortunately, Lewin had a diametrically opposite attitude toward his students, with whom he often would go to cafes for informal seminars and discussions of research ideas.

Lewin was not only himself an innovative and path-breaking researcher, but he was also able to inspire his students into creative research with his infectious enthusiasm for his subject. American social psychology has been long dominated by Lewin's students (the most famous among whom was Leon Festinger, with his very influential theory of cognitive dissonance) and by the students of Lewin's students. Not for nothing has Lewin been considered by many as the father of modern social psychology. He was extraordinarily informal and friendly with his students, as has been strikingly described by his biographer in the following passage (Marrow, 1969, p. xi):

> Lewin's influence was in no small degree facilitated by his personal qualities, his intellectual power joined to his warmhearted concern for and rapport with other people. He extended a warm welcome to all who sought him out. He awakened in students an enthusiasm and a zest rare in teacher-pupil relations. Unlike the typical German professor, he was a natural, spontaneous democrat. Almost everyone called him by his first name, and he had time for everybody and everybody's problems. These he would consider with the same enthusiasm he brought to his own problems—even when he thought them to be insoluble.

My teaching style has developed across years, if not decades. Teachers have their own styles, appropriate to their personalities or temperaments. One teacher's style may not be appropriate for another. Some lecturers sit on a chair and may even read from a book or their notes. Some like to stand and refer to their notes or lecture outlines from time to time. I belong to a group of lecturers who like to make a peripatetic delivery of instruction, with hardly ever looking at my notes or the articles I have in my folder. In the earlier days I very much needed a lectern, so much so that if I didn't have one in my classroom I would hunt around for one in other classrooms. Now I have changed so much that I put away the lectern in a corner (it seems like a barrier between me and the students), and speak extemporaneously, rarely using the material I have in my folder on the table (which can be used as back-up in an emergency or to give more detailed information). Sometimes I do read an important passage verbatim, or look at my notes or some article to give exact and detailed information about an article's provenance (journal name, volume, page numbers, etc.) or to present some precise data for the solution of a statistical problem. I use the blackboard prolifically, which helps the students with spellings of difficult names and words, and slows down my exuberance. For some classes I present videos and occasionally transparencies, as and when necessary, which makes a refreshing change from straight lecturing. But to me the most important thing in a graduate class is the give and take between teacher and students, so that questioning, discussion, and debate can promote the goals of understanding, analyzing, and retaining—sometimes even generating—worthwhile ideas, concepts, and propositions.

Teachers have to develop their own styles, appropriate to their personalities or temperaments

The most important thing in a class is the give and take between teacher and students through questioning, discussion, and debate

I like to take a historical approach to any subject I am teaching, and am especially interested in the histories of philosophy and science, even apart from the history of psychology, which I have often taught. When I teach statistics I talk about how it originated out of interest in gambling, especially probability

theory which is the foundation of statistics and which was an outcome of a fruitful collaboration between gambling and mathematics as exemplified by the pioneering contributions of Girolamo Cardano, Chevalier de Méré, Blaise Pascal, and Pierre de Fermat.

When I talk about central tendencies and variabilities in the distributions of scores, I emphasize the importance of not limiting one's understanding of data to averages, because of the vital information often given to us by variations. For illustration, I tell the stories about the statistician who calculated the mean depth of a river to be two feet, waded through the river, and was drowned, and the statistician who, being tortured by having his head put in the freezer and feet in the oven and then being solicitously asked as to how he felt, unflinchingly declared that he felt fine *on the average*.

When I come to talk about the errors of inference such as the Type I error (rejecting a true null hypothesis) and Type II error (not rejecting a false null hypothesis), I explain the relative importance of these two errors by practical examples. If you see in the dark something that looks like a twig or a snake, what kind of error would you want to make? It is safer to make the Type I error (rejecting the true null hypothesis that it isn't a snake) than make the Type II error (not rejecting the false null hypothesis that it isn't a snake).

I may also mention Blaise Pascal's storied wager regarding belief in the existence of God. Pascal said it is much less foolish to wrongly believe that God exists rather than wrongly believe that He did not exist. I might even talk of Bertrand Russell's counterargument to Pascal's wager in which Russell presents an unlikely scenario wherein God, putting a premium on intellectual honesty, has deliberately given scanty evidence of His existence, to test human beings and to punish them for believing in His existence opportunistically merely for the sake of the rewards in the absence of cogent evidence. It has been my experience that such stories and illustrations can make the subject of statistics vividly engaging. It should be apparent from the above that I sometimes go out of my way to

Stories and illustrations can make the subject vividly engaging

lighten the air with humor or even to provoke with politically incorrect pronouncements.

In order to speak extemporaneously I have to read my material thoroughly and have to depend on my memory, which generally does not fail me even at my present age. I love to walk around and look my students in the eye, and thus get them involved in the matter under discussion. I think students love to hear an instructor lecture without notes. I believe the spontaneity, vivacity, and freshness of a delivery without notes are incomparably superior in their pedagogic impact to the insipid monotony of a mechanically delivered lecture. One senses a closer bond with the students when one speaks to them, eyeball to eyeball, without reference to any extraneous material.

Students love to hear an instructor lecture without notes

To my mind, one of the worst things lecturers can ever do is to read their lectures, which is a temptation that could prevail if they habitually wrote their lectures. I almost wince when I hear an instructor, as I once did, talking about having finished writing all his lectures. I suppose one could do such a thing in the beginning of one's teaching career, but I would recommend that teachers should try to aim at the wonderful rapport one can have with one's students by speaking to them in a conversational manner without the formal straitjacket of an ironclad lecture template.

I have also a confession to make. To me the syllabus and the textbook are not very important. I do not have any qualm in ignoring the syllabus or the textbook if I think it is appropriate to do so. If a teacher knows a subject—and that is a given—he or she should not worry too much about the syllabus. What the teacher teaches is the syllabus, especially in a university system wherein the teacher decides what syllabus to follow and what textbook to use. In the Indian university system wherein the syllabus and textbooks are often determined by a committee or board of studies of which the instructor may or may not be a member, the situation may be somewhat

To me the syllabus and the textbook are not very important if a teacher knows the subject

different, especially when the instructor may not be also the examiner for the given course. Here one may have to pay some attention to completing the syllabus and making sure that the students are well prepared for their exam. But when the syllabus, textbook, and exam are all determined by the instructor, he or she naturally has a great deal of freedom to decide what is important and what is not. I don't feel constrained, under these circumstances, to finish my syllabus or to follow the textbook (which I myself might have chosen). Again I must confess that I sometimes don't even bother to read the textbook, especially in social psychology, for which course I prefer to use important articles as well as my own writings as the scaffolding for a course completely designed by me.

In conclusion let me say that nobody should be a professor without having something to profess, a *Weltanschauung*, something to be passionate about. A professor must have a profound knowledge of the subject, but that is not enough. Mere scholarship can be drab and soporific. What is also needed to keep the students excited about the subject is effervescent and lively teaching. As one preacher said, "If somebody in my audience sleeps during my sermon, wake *me* up." If my students lose interest or enthusiasm in what I am teaching, it is my fault, not theirs. This thinking is beautifully expressed by the following quotation from an anonymous professor of Slavic languages and literatures (Bain, 2004, p. 36):

Nobody should be a professor without having something to profess, something to be passionate about

> I believe that if you've chosen your field properly, you've chosen it because it answers what I call the god inside of you—or if you like, the devil inside of you. If the students see you pursuing that, with all your heart, all your soul, and all your might, they'll respond.

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ACADEMIC AVENGERS

10

Passion is the Key

A K Mallik
Mechanical Engineering

George Bernard Shaw once said "Those who can, do. Those who cannot, teach." If the choice of teaching profession is dictated according to this principle, then there is nothing much to write about teaching. But every one needs to learn and teachers are supposed to help in this process of learning. What all teachers (and students) need to remember is that while almost everything can be learnt, almost nothing can be taught. This is equally valid for "teaching". No one can teach others how to teach. Every one has to develop his or her own style of effective teaching as Mark Twain has cautioned us "Let school not interfere with your education."

A teacher is supposed to be only an aid to the learning process, at best a motivator. To be a successful motivator, one needs to be motivated. To be successful in this, like in every thing else, one needs to be passionate and honest, rather than just being professional and knowledgeable. No doubt the latter two qualities are essential but not sufficient.

Successful teachers are passionate and honest and not just knowledgeable

After teaching for more than thirty-five years in the IIT system, I must admit that I find teaching is much easier than writing about teaching. We always remember our teachers and try to consciously or unconsciously simulate the good qualities that we had appreciated in them as students. We also learnt from our teachers what to avoid while teaching. The set of teachers mentioned above are not necessarily mutually exclusive. The same teacher might have had both these opposite attributes in different aspects of teaching.

The style of effective teaching varies widely depending on the level and quality of students, the nature of the subject and the size of the class. The one thing that remains invariant is to try to motivate the students to think and learn on their own. The best way to achieve this is by posing challenging problems once the background material is covered. Encouraging students to ask meaningful questions is an integral part of good teaching. Any honest doubt is a meaningful question. If it is straightforward, the teacher answers it. If the question is a well-thought one, then the teacher must appreciate the question and explicitly say so to encourage the students. Special credit should be given if the teacher cannot immediately resolve it. The discussion that follows even without providing a satisfactory answer can often be more enlightening than a quick, smart answer from the teacher.

Effective teaching is about having to motivate the students to think and learn on their own

The teacher should refrain from being just a conduit of information available in books and other sources. How the teacher thinks and the presentation of this thought process is more important than what is stored in the memory bank of the teacher. My teaching experience is mainly limited to the IIT system, which ensures (i) a lot of freedom to choose the course content and (ii) mostly quite intelligent and some very motivated students. So whatever I write will be based on these two assumptions.

The contents of a course must justify why it constitutes a separate course. A brief history of the subject, how it grew, and what new questions had to be answered before it could demand a separate course is often very stimulating.

How this subject fits in the overall knowledge of that particular discipline also needs to be emphasized. Whenever possible, all the topics need to be threaded with a single theme and should be serially presented. At the end, current questions awaiting answers ought to be mentioned. A dead subject cannot attract young, inquisitive minds.

The contents of a course must justify why it constitutes a separate course

As an example in Mechanical Engineering, one can talk of a time when steam and internal combustion engines constituted a major part of the discipline. Consequently, analysis and design of a slider-crank mechanism had an important place in a course on "Theory of Machines". Later on, the development of other high-speed and heavy-duty machines including robots demanded a more generalized approach to the study of motion and force transfer by a series and/or parallel connection of a number of bodies constituting a machine. Specialized techniques applicable to only slider-crank mechanisms lost their importance. Rather "Kinematics of Machines" dealing with generalized geometric aspects of motion transfer grew into a separate course. While teaching kinematics, the teacher needs to point out that this provides only one of the steps towards the overall design and fabrication of a machine. Towards that end, knowledge in other subjects, such as machine dynamics/vibrations, thermal sciences, fluid dynamics, manufacturing processes, etc., that constitute the overall programme of mechanical engineering is essential.

An example

At the basic level, a good text stressing the fundamentals should be prescribed and students must be encouraged to study a good text thoroughly rather than banking only on the class notes. After developing any theory, both its limitations and applications to real life engineering practices should be pointed out.

Students must be encouraged to study a good text thoroughly rather than depending only on class notes

For a large class, a systematic presentation with neat board work gains importance. But still I prefer a conversational mode rather than a one-way traffic

where only I speak and the students listen. A seminar mode may be somewhat all right for certain advanced topics presented in a graduate course with a few students. In every presentation eye contact with the students is a must to get instant feedback about the reception of what is being delivered.

For better understanding both ears and eyes are helpful in assisting the brain. So visual aids, static or dynamic, whenever feasible, should be used. Such aids help to wake up sleepy students and also moderate the speed of delivery. Computer animation, small-scale models are both found to be quite effective in communicating complex ideas. Towards this end, I have used coloured plastic articulated models of real life mechanisms. These could be projected on to a screen using an overhead projector. The models could be moved to replicate actual relative movements between various parts of a machine. These demonstrations are very popular with the students. No doubt because better understanding, than what could be achieved through a number of clumsy and complicated drawings and long oral explanation, is achieved.

In large classes, a systematic presentation, neat board work, good body language and audio visual aids help

Classroom demonstrations in a course on dynamics/vibration are well received by the students. These include simple experiments on resonance, both forced and parametric, to show these non-intuitive phenomena dramatically. The surprising motion of a superball, thrown with sufficient backspin, adds great interest to the study of impact phenomenon. A complex topic like the stability of a rotating rigid body can draw the interest of the students by the demonstration of sudden flipping of a tippie-top. The direction of the gyroscopic couple, again somewhat counter-intuitive, is demonstrated by asking a student to rotate the axis of a spinning bicycle wheel while standing on a free platform. The demonstrations should be simple (but not trivial) and not very time consuming. At the same time, these should be timely and directly relevant to the course material so that the students can fully analyze and appreciate the importance of

Use simple, effective classroom demonstrations to teach complex topics

the theory. Similar simple demonstrations can also be used effectively in a course on Mechanics of Solids.

The material that is to be covered in one lecture needs to be clearly thought out. Here past experience helps in deciding how much can be comfortably covered in one lecture. This helps to avoid rushing through the material at the end of the class when the students are already mentally tired. A little recapitulation of the end part of the previous lecture may ideally form the beginning of the next lecture, especially when the same topic is continued. In IIT Kanpur, tutors (who may be past or future instructors of the same course) involved in a course are normally expected to sit in the lectures delivered by the instructor. This practice helps both the instructor and the tutors who freely discuss what went all alright and what did not in a particular lecture.

The material that is to be covered in one lecture needs to be clearly thought out

One important thing is that the teacher should not appear intimidating and discriminating—that discourages the students from asking questions. Even when the content is "old" for the teacher, one needs to remember that the students are going to hear it for the first time. The teacher should appear to be excited about what is being delivered. This entails a bit of acting in some sense. The teacher should try to recreate the same excitement that he or she had during their own first clear understanding of the concept. If the teacher appears to be passionate about the subject, then the students share the same passion. It is this fun of learning together a new thing that goes a long way in establishing a strong bond between the teacher and the students.

The teacher should not appear intimidating; that discourages the students from asking questions

There are three distinct academic activities—creation, assimilation and transmission of knowledge. No doubt the last two are of major importance for a successful teacher. The master, who creates, can share the thrill of creation directly. However, the teacher, even if not directly connected with the creation of knowledge, should remain aware of the current trends in the subject. Whenever

opportunities arise, mention of the current activities and trends remind the students that knowledge by definition is incomplete and ever expanding.

Normally in the teaching profession, terms like teaching "load" or teaching "duties" are used. A teacher, aspiring to be successful, needs to look at teaching as something beyond mere professional duty or load. A lot of enjoyment is derived even if a few young minds can be ignited; it is the ones who remember their teachers for a long time. That is the best reward for any teacher, much bigger than any official recognition. Most successful teachers are passionate communicators—rather than just impassionate carriers of knowledge and information, who develop personal relationship with the students.

A teacher needs to look at teaching as something beyond mere professional "duty" or "load"

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KNOWLEDGE KNIGHTS.

11

Teaching and the Pursuit of Clarity

Samir Mathur
Physics

Suppose you are walking down a corridor in a University, in the Department of Physics. You peep into two different classes, and observe the way the students are studying. Which of these two modes of teaching would you say is 'good'?

A. In room A you see that the teacher has written a problem on the board. The solution is long, and the students have been given an hour to obtain it. The students are looking through their textbooks, trying to grasp the needed tools, while the teacher sits in a chair at the head of the room.

Model I of Teaching

B. In room B you find that the students are clustered around a set of 'hands on' demonstrations, where they can explore the principles of physics by working with gadgets. The students are divided into small groups, and can talk among themselves. The teacher walks around the class, answering questions.

Model II of Teaching

My impression is that in today's world of education almost all people would argue that the teacher in room B is doing the right thing, that educational resources must be geared towards ensuring that all students should one day be taught in this way and that teaching in the manner of room A should be made a thing of the past. I will therefore probably surprise you by asserting that neither A nor B is a useful path to excellence; further, if you force me to choose between just these two options, I would argue that the students of room A have a higher chance of success later on in life, at least if we assume that working with physics is their goal.

Neither of these models will exclusively lead to excellence

So what is the missing ingredient? Here is my first belief:

The only time we learn is when we answer a question that we have asked on our own.

How does this work? Isn't it the teacher who has to ask the questions, and we discover the answers? Not quite, I would argue. The educational system—the textbook, the teacher, the exam—can bring some broad questions to our attention. These questions force us to acknowledge that we are confused, we don't understand many things. At this point we must undergo a process of introspection, sitting by ourselves to make sense of things. The book can help us, and on occasion we may ask the teacher a question. In the process of solving any one question we must ask ourselves hundreds more, and evolve answers to these to make a complete picture. At the end we would not only have answered the questions posed by the teacher, but would have mastered the area as well.

The only time we learn is when we answer a question that we have asked on our own

Let us assume for a moment that this is indeed the way we should learn. Then we see that a lot of the effort of modern education is simply taking us away from our goal. First, I find that students in high school and college are heavily loaded with coursework. They stagger from day to day, trying hard to balance class attendance, a crushing load of homework, extracurricular activities, and possibly a need to work some hours a week to support their education. The last thing they have time for is to puzzle out on their own an understanding of the subject. Most things are learnt *partially*. If I ask my undergraduate class 'Do you know Fourier transforms?' I get a general response—'Well, sort of...'. The material was 'seen', some homework done, some partial understanding obtained, and life moved on to the next course. But in mathematics or physics, concepts are like building blocks; if they are hard and well-made you can stack them on top of each other to reach great heights, while if they are soft and fuzzy they don't stack well at all. So it seems that the more we try to 'stuff knowledge' into the students, the weaker they might end up becoming. I will summarize this in my second belief.

Students learn most things partially

What we learn we should learn thoroughly, an 'exposure' to ideas is not very useful.

Clearly one must make a distinction here: It is the *basic* ideas that students must learn thoroughly, and it is certainly useful to have an 'exposure' to a wide variety of *other* facts. But in our attempt to 'stuff knowledge' into students at an ever increasing pace where do we get to make this distinction? I think we have got ourselves into this mess by thinking that we deliver good education when the students 'know' more things, or acquire more 'skills' like learning to use Fourier transforms. I would argue differently:

It is the *basic* ideas that students must learn thoroughly

Students need to develop the ability to puzzle out results by sustained thought on a problem; acquiring 'knowledge' or 'skills' is not a worthwhile goal of education.

This exposes another weakness in modern education: The increased reliance on short 'multiple choice' questions, where one either knows the answer as a 'fact' or obtains it by the 'skill' of plugging into a formula. By contrast when faced with a well-designed 'long' problem the student must understand the setting, evolve a method of attack, explain to the grader (examiner) his steps (in the process understanding them much better himself), gather together many different concepts, and arrive at a final answer which he may cross-check using other physics reasoning. The

Students need to develop the ability to puzzle out results by sustained thought on a problem

ability to think and reason with concepts is thereby developed, and I would argue that only this represents true learning.

If developing 'sustained thought ability' is a goal, then we see why some of the tools of modern education can be distractions. When students work in groups they do not think by themselves; the individual thought processes are continuously interrupted by conversation and when the group arrives at a feeling that between them they understand the issue then the students move on. It can of course be useful for just two or three people to get into an argument on an issue which each has thought about previously, and resolve differences in their understandings; in fact this is an extremely *useful* step in learning. But I find that when the initial learning itself is done as part of a group then a very hazy picture of the material is generated in the students' minds.

A sustained and informed argument on an issue among two or three students is a more useful step in learning than group work

Much is made of the value of 'demonstrations' or 'hands on' learning where the student explores concepts by seeing them in 'real life'. I recall an episode from my early years at MIT, teaching introductory mechanics. The main instructor would give a lecture and do demonstrations, and the next day the 'recitation instructors' (I was one of them) would divide the class into smaller groups and iron out ideas or do problems. The lesson of the day was 'Impulse', which is the idea that if we deliver a sharp blow to an object then a useful measure of the impact is the product of the (large) force and the (small) duration of the force, rather than the force itself. The main instructor was a very dedicated teacher, but in addition he was a Karate expert, as was the rest of his family. The class first watched a video on 'Impulse' where cars smashed into walls and other 'fun' stuff happened, and some formulae made their appearance. Then the instructor, his two sons, and little daughter, all broke a variety of boards, to the cheers of the class.

Students do not learn from mere 'hands on' learning

The next day I met the class for the recitation, and asked them to explain 'impulse'. There was no response for a while, and then somebody offered the word 'force'. Somebody else said 'sudden force'. Another said 'impact'. Moving on from there, over the hour we managed to get together the basic ideas and formulae for 'impulse'. The hour long 'movie and demo' session had by itself not left any clear ideas, though everyone agreed that it was 'cool' and made physics 'interesting'.

But after the class my mind flew back 15 years, when as a high school student I had to learn the concept myself. The teacher had just written it on the board, and it was up to us to make what sense we could of the notions before we would be faced with an examination. At home, with the book on the table, I made up examples of my own, checked out units of various quantities, tried to understand when the concept was useful and when it was not, and over the course of a few hours learnt whatever there was to learn about the topic. By contrast at MIT we had taken the students through several pathways to the notion, and they had faithfully followed us on this journey, but at no stage did we leave them the time or energy to think in peace over the idea themselves. I have the highest regard for the professor who had the energy to arrange such a wonderful 'demo' session, and the students I had were outstanding as well. But I would say that at the end I was left dissatisfied with the level of clarity that we had managed to impart to them. I would summarize this feeling in the belief:

The teacher who writes down the concepts on the board and asks students to grapple with them helps students learn most

We don't need 'hands on' learning, we need 'minds on'.

Let me be more explicit about this. It is of course possible to devise, with enough effort, an apparatus that will demonstrate a physical principle. But in most cases it is more helpful to *imagine* what the physical entities are doing, letting

It is important to let students imagine what the physical entities are doing rather than demonstrate a physical principle

the mind make a 'virtual' lab where objects move, attract and repel. Consider a simple electromagnetic device, the capacitor. This consists of two plates, separated by a thin layer of dielectric material. Wires are connected to each plate, and by connecting a battery to these we can store charge—positive on one plate and negative on the other.

But if you obtain a real capacitor you will find that the plates are rolled up into a tight cylinder, which is then encased in plastic and sealed, so there is not that much that you can actually 'see' about the capacitor. One may connect a battery across the capacitor and observe it charge and discharge. But I would contend that what can be learned from this 'demo' is limited; much more can be learned by letting the mind visualize the charging process: The battery pushes the electrons onto a plate, the electrons accumulate there until enough pile up to repel further ones from joining them. The positive charges on the other plate attract the negative charge on the first plate, holding it there and thus increasing the charge that can be stored. An evening spent in such a 'minds on' exercise leads to a deep understanding of the capacitor. What is more, this understanding can be transferred to understanding a spherical capacitor, which has two spherical plates, one inside the other, or to the idea of stray capacitance, which arises in circuits whenever one wire passes near any other metallic object. It can also help understand time dependent voltages, where electrons surge to and fro from the plates. Obviously we cannot keep making physical 'demos' to illustrate these ever more complex principles. But the modern student mind seems to be getting increasingly attached to 'learning by doing' in a lab setting, while the power to do 'minds on' learning seems to be fading away, to the detriment of the overall education process.

Example of a 'minds on' exercise and how it leads to a deep understanding of abstract concepts

The reader must be wondering: When do we get to the important part, the role of the teacher? The notions I have advanced above will help us

The role of the teacher is to facilitate and enable the student to ask his *own* questions

define this role. Should the teacher explain the physics very clearly, making sure that the students understand every little concept? No, for we have argued that the important thing is for the student to ask his own questions and clarify his thoughts. Should the teacher do a lot of nice 'demos'? No, for these have limited success in advancing student learning. Before suggesting what the teacher should do, I want to talk about two other ways in which the influence of a 'good' teacher can be negative rather than positive.

I have said that the student mind must be in a state where he is continually asking questions and refining his understanding. The most important tool that he needs is *confidence*. What kind of a mind will be able to ask its own questions and try to make its own answers? A mind that has some faith that its questions are good ones, relevant ones, not stupid ones whose answers are obvious. In any class setting, the students who are ahead of the pack are the ones with the courage to ask bold questions; the others feel that the answers are probably obvious to everyone else, so they will pick up on the facts 'later'. Obviously we must strive to make all students feel that they are as valuable as any others in the class. But a more important, though somewhat subtle, effect is played by the competence of the *teacher*. Suppose the teacher in a college course is a leading member of the scientific profession, with many famous results to his name. He approaches the class with an atmosphere of confidence, and thus conveys a subtle feeling that everything in the subject is known and clear, its just a matter of time before he will be able to convey it to the students and then the students will know what they needed to be taught.

Teachers must strive to make *all* students feel they are as valuable. This gives them the confidence to ask questions

If such is the case, what effect does it have on the students? Even the good ones retreat into a passive mode, where the teacher leads and they follow. They do not originate questions themselves, because a complete presentation of all issues will be given to them in due course.

An intimidating teacher makes even good students retreat into passivity

If something is not addressed then they imagine that it cannot be of much importance, since the teacher is a leader in the field and will competently cover all that is really needed.

Conversely, I find that the truly animated students are to be found in a course where the students believe that they know about as much as the teacher, or at any rate that they can obtain a clearer alternative understanding of some topics if they strive hard enough. There is joy in leaping over the authority represented by the teacher, but even more exhilarating is the feeling that any ideas they explore from this point on are 'new territory', at least as far as their local knowledge sources are concerned.

Truly animated students are to be found in a course where the students believe that they know about as much as the teacher

I remember that in my course of introductory physics in college we had lectures (ably given by a principal instructor) followed by recitation sections carried out by other teachers (the education at IIT Kanpur was modeled after the system at MIT). Our recitation instructor would put a problem on the board, and say, quite simply, that he did not have a good idea of how it was to be done. I recall a feeling of eagerness to step up to the board and show the teacher and the class a path to the solution, and many other students were equally eager to chip in. We did not have a high opinion of the teacher (we just thought of him as a 'nice guy') but we learnt quite a bit of physics. In later years when I look back at those classes I realize that perhaps that teacher fooled us all; he probably knew the answers perfectly well, but in an ultimate act of self-sacrifice made us believe that we students controlled the learning in the class.

An example of how this method works

A second, related problem is that in the modern method of teaching the teacher decides what he will teach, chooses what he will ask in the exam, and assigns the grades; he is in complete control of

When the teacher decides what he will teach and what he will set in the exam, the students learn only what he teaches

the learning in that course for that semester. While it is often said that this allows the teacher to be 'creative' about what he will teach, and to tailor the course to the class needs, I find that it also has the effect of 'enslaving' the students to the teacher. They learn only what he teaches; they don't read the book. Often they don't buy the book, or they sell it when the course is done. The exam questions are similar to what the teacher said in class, so they just try to remember what the teacher said, rather than learn in depth the basic principles.

I recall the graduate qualifier examination at Ohio State. The students take graduate courses on mechanics, electrodynamics, quantum mechanics etc., and then must pass the exam to start their Ph.D. Sometimes the exam in a subject was set by the same instructor who taught the corresponding course; in this event the students all did quite well. But when the questions were made by a different professor, the scores were much lower! If the teacher sets the exam himself then the students get a false sense of confidence; tne questions may look hard but they can be answered by closely repeating what was done in class.

The exam questions should be set by a subject instructor who hasn t taught the class

With all these issues in mind let me try to outline how I would plan and teach a course. I will take as an example an undergraduate course in electrodynamics, a course that I have had occasion to teach over the years. Rather than detail my experiences from any one quarter of teaching let me make an imaginary vignette out of the experiences that I had over the different times that I taught the course. I will also add suggestions that I have not had occasion to implement but would like to, the next time I teach the course.

How I would plan and teach a course

At a typical University this course would have mostly juniors (third year of the undergraduate curriculum), though there will also likely be some sophomores and seniors. The first thing is to assign a good text for the course; in this case the book by Griffiths has served me well. The important thing is that I will then follow the text closely, so that the students do so too and learn to use that book as a resource for all time.

I also state at the start of the course what chapters will be covered. The students can thus read ahead if they wish, and the good ones will. I would like to ask a *different* professor to make the exams. The students should know that the exam will not be made by me, so it is up to them to absorb with clarity what is in the book. The exam questions should be long ones where they have to develop a whole train of thought and computation, not multiple choice type questions. It is good to ask for at least one 'derivation' of a formula. This is something rather uncommon these days: Students are usually taught how to *use* formulae, derivation is considered a waste of time. But by working through derivations they learn the process of scientific thought by which results are arrived at, and if they are to obtain any new results of their own later in life it is invaluable that they imbibe the process of systematic and rigorous reasoning needed to obtain a result.

The next important issue is to identify the basic principles of the subject, and insist on 100% clarity on these topics. Just 'exposing' students to a wide swath of material is not particularly useful. I would keep the syllabus comparatively light, and avoid excessive use of demos, movies, etc. so that student time is freed up for thorough introspective learning. For the course under discussion this means for instance that we learn 100% clearly the force law between charges, both stationary and moving, and we work through a detailed derivation of the Gauss law, which is an important insight obtained from the force law. I have not found it very helpful to conduct demos showing giant sparks jump between electrodes; such demos do have entertainment value, but it is questionable what physics stays in the mind at the end.

The first time I was teaching this course I had a strange experience: The students would do very well on quite difficult questions, and then get stuck on some seemingly simple one. We had come to a point where the students had to find the electric field produced by charge distributed uniformly through a *cone*. Only a few could do this; the rest asked for 'similar solved examples' which they could then use to do the problem at hand. After some discussion with them I realized that this had become the way they always did problems: Look at solved examples, and then try to fit the given

Students have become habituated to the 'plug and play' method of solving problems

problem as closely as possible into the pattern of one of these examples. But this makes a mockery of the very purpose of assigning problems for homework! I would think that the idea of homework problems is that students try to absorb the *basic* principles by struggling to apply them to specific situations.

To remedy this I tried the following strategy, which worked out surprisingly well. I invited all those students who were unsure of how to attack this and similar problems to show up for an 'evening session', 7.00 pm to 9.00 pm. About half the class, 15 students, came. I put the question on the board and sat down at the back of the class, asking the students to figure out a solution. After some initial hesitation one girl got up and made a first attempt. I made it clear that small steps and potentially wrong directions were all fully welcome since they help to channel thinking. When the first student got stuck, someone piped in with a suggestion and took up the chalk. Over half an hour of intense discussion the essential idea emerged—one had to slice up the cone into thin discs; the result for a disc was known, and these contributions could be then added up. But this is the essential idea underlying the whole of calculus! So with a bit of thought the class had uncovered the philosophy of calculus for themselves. My only contribution was to point out this fact to them, which they found quite thrilling.

Teach students to discover the basic principles of the subject through discussion

We held more such sessions, and I could feel that as time passed the students were gradually moving away from 'plug and play' as the method of solving problems to a more introspective approach where puzzling a few hours (or even days) over a confusion became an acceptable way to spend time.

A last point about the course. When preparing a lecture one develops a 'story' for each topic: What is the issue, why it is important, how it is to be understood, how it relates to other things we have learnt. For example, one comes across the

When preparing a lecture develop a 'story' for each topic—what is the issue, why it is important, how it relates to what follows next

force law on moving charges. If I have to prepare a lecture, I have to start with the electric force on static charges, how relativity tells us that there must be a *magnetic* force on moving charges, and finally go through a derivation to arrive at the force. It is only the complete story that can hold interest; the final answer by itself is only a dry formula just like so many others. It turns out to be useful to have the *students* develop understandings of little topics, and have *them* teach it to the rest of the class. Rather than learn isolated facts they learn to see the complete picture around a formula. For example the students can give mini-lectures on the solenoid and the field it creates, the Biot-Savart law for magnetostatics and its derivation etc. The students pay much more attention when one of *them* is struggling to get the ideas across, and they learn with more active participation.

In conclusion, let me return to the theme I have tried to develop here. It may seem that this essay has been rather negative; many modern approaches to teaching have been criticized, and it may seem that there is a reactionary desire to return to the 'good old days' familiar from my own youth. But I would say instead that the message here is one of hope. Suppose great education needed teachers who are great pedagogues and masters of their field, and expensive 'hands on' equipment. Then only a privileged few would be able to receive this great education, perhaps the students at expensive Universities like MIT where a year of tuition, room and board costs more than $40,000. By contrast education at an IIT in India costs $3,000 per year. But when I look around me in the US I see that graduates from the IITs are as successful as those from MIT; this is certainly true of my field in physics, and I see a similar pattern among those that work in engineering or management related professions. Software engineers from a variety of Indian colleges challenge the best in the world today, and multinational biotech companies are setting up shop in India to avail of our educated talent pool.

So in the end we see that learning does not have that much to do with 'great teaching'. It is the student's mind that has to reach out and gather knowledge from books and introspection, with the teacher being at best a facilitator for the process. The student does not have to

Learning is not about teaching methods but about the ability to kindle thinking and the desire for knowledge in students' minds

despair that he cannot find that magical personality who will inspire and make it all clear. The inspiration to learn is in all of us, though all too often the burden placed upon the mind by educators dims our desire to ask and understand. And a good teacher is one who understands this, understands that learning is the students' own journey in which the teacher is an occasional helper, not the master.

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Teaching Titans

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No Short Cuts to Teaching

Shiva Prasad
Physics

When I accepted the offer to write this essay about my teaching experience and what, according to me, makes a great teacher, I knew that I was facing a difficult task. Honestly I do not think that I am a good teacher and even if I am, I do not know what it takes to make me one. The answer to this question required some soul searching. What had made my job more difficult was the mandate given to me that my article should help others improve their own teaching style. I know every teacher has his or her own teaching style. It is not easy, or even possible, for any one to teach like someone else. Many great teachers have taught me, but I have never been able to teach their way. Nevertheless I agree that some tips here and there may help new teachers improve their style. So I agreed to share my experiences on this subject.

The first step towards writing this article was to make myself more conscious of my teaching, so that I could estimate when my lectures were good and what made them good. Still this could have led to a biased opinion, because I am used to teaching IIT Bombay students, who are probably one of the best that one can hope to get at the undergraduate level. The expectations that these students have

from their teachers, force us to prepare in a very different way, than when the students are not so bright. So I have also tried to take my small experience of teaching students at other universities into consideration while writing this essay. Further in this essay, I have concentrated only on teaching through lectures, even though in most science subjects the laboratories also form an equally important part of education. Finally, I have also tried to address some questions that many of us face as teachers.

I think two of the most important virtues of a person in any profession are sincerity and integrity. Teaching is not different in this aspect. Teachers must be sincere, honest and totally devoted to their profession. However, it is not easy to have these virtues, unless one has an inner motivation to become a teacher. Anyone who takes up teaching as a profession should ask the following questions. Why do I want to become a teacher? Is it just because I have no other career option, or because I want to earn more money by being a part of the coaching classes? Or is it because I like the respect that I may get from some of my students? If the answer to these questions is yes, then probably he or she does not have the necessary motivation.

Teachers, like any other professional, must be sincere, honest and totally devoted to their profession

Teachers must be in this profession only if they want to contribute to the life of their students, by giving knowledge, which they themselves have acquired after a lot of effort. They must have the broader aim of contributing to society through their students. They must realize that as teachers it is their duty to let the fresh minds of students—the real torchbearers of the subject—breed on ideas. They should be ready to work hard and strive to give the students their best and nothing but the best.

Next to motivation, in order of importance is the knowledge of the subject they teach. I have not ranked knowledge first, because if a teacher has motivation he can gain knowledge but the reverse may not always be true. When I say knowledge, it does not only imply its breadth, but also the depth. Teachers must know the finer details of the subject. For this, they should be ready to learn from all sources. One of my teachers used to say that we should be like the honeybee. This insect makes so much effort by going to different flowers to collect the best honey. Teachers should have a similar approach towards acquiring knowledge. They should be students first, and then the teacher.

If a teacher has motivation, he can gain knowledge, but the reverse may not always be true

In my personal career as a teacher, I must admit in all honesty, that my students have been my best teachers. I was fortunate to have taught a set of very bright students. Had these students not asked me all those brilliant questions whose answers I did not know; I would have never gone to the depth of the subject. Their varied approaches to the subject forced me to view it from angles, which I never knew even existed.

Thirdly, a teacher must be a good human being. In fact being a good human is more important than being a good teacher. One who is a good teacher but a bad human being is of little use to society.

A good teacher goes much beyond motivation and knowledge. I have seen extremely knowledgeable persons, even Nobel laureates, who are poor teachers. I have also come across teachers who probably did not know much beyond what they taught, but they were regarded as excellent teachers. This brings me to the question, what is that other most important thing that is needed in a good teacher?

A good teacher goes much beyond motivation and knowledge. One may not know much beyond what one teaches and yet be regarded as an excellent teacher

After a lot of thought on what is the other single most important issue for a good teacher, I landed with the following. Teachers must come down to the level of their students in their lectures. They should be able to link the information

that is being taught to the existing knowledge of the students. It is only when a bond is formed between the new knowledge and what a student already knows that the knowledge stays firm. It is almost like completing a jigsaw puzzle in the minds of the students, where the teachers are trying to fit new pieces to make the picture clearer. Suppose I want to teach the laws of motion to school students who have no prior knowledge of it. If I start by teaching them straightaway, it might not be convincing, howsoever well I teach them. If however, I add a few sentences linking the laws to the experience of motion they have had, my teaching would make more sense to them. Similarly if I have to teach relativity, I find it important to start from the classical laws of motion with which the students are familiar and then link the laws to relativity.

One of the most important challenges for a good teacher is know how to come down to the level of the students

One crucial factor in adjusting the level of lectures is to have a good idea of the background of the students. If this is broadly uniform, adjustment is easier. However, the problem arises when there is a lot of variation in their backgrounds. In such a case one of the approaches could be to lecture at the level of weak students so that those who require maximum help are taken care of. The second approach could be to adjust to the level of the brighter students since it is only these who shall take the subject forward in the future.

Personally, I have always taken a middle approach. I have tried to concentrate on the average student of the class. This has helped me in not making the weaker students feel too uncomfortable. They can be further helped by clearing their doubts after the class or even by arranging separate help sessions. On the other hand, for the brighter students my lectures turn out to be a bit simple. Many of them do not mind this because very often they too are not clear about some of the basics of the subjects, and they are happy to get their doubts clarified. I, however, realize that my approach goes against the philosophy of taking extra care of the torchbearers of the subject. But then I also feel that it is important for them not to be tied to

If the class has a heterogeneous composition the teacher should address the average student

the thinking of a given teacher. They must develop their own understanding of the subject by going though various books. Posing some challenging questions during the class can motivate them to do this. I feel that it is important that the bright students develop their own thinking in the subject.

Students must not be tied to the thinking of a given teacher

Teachers must plan the schedule of the course in the very beginning of the semester. The students have only a limited capacity of learning new things in a given period. Howsoever interesting be the subject it becomes boring if dealt with at a very fast or at a very slow rate. Hence looking at the background of the students, a proper pace has to be determined. One can then decide the total number of lectures to be given to cover a particular topic.

Teachers must teach the course at the proper pace since students have a limited capacity of learning new things

Giving examples and solving problems constitutes one of the best ways of learning the subject and must be incorporated in teaching. One should decide the number of examples that are to be worked out in the class. For a difficult portion, it helps to work out the graded examples. One can start with a simple example and then go over to more difficult ones. In the IITs and in many universities there is a separate tutorial hour each week devoted to problem solving. This hour should be prepared with a lot of care with tutorial sheets containing problems to be given in advance. The problems in these sheets can be planned to serve other purposes also. First they can be used as an extension to the lectures so that portions requiring special attention can be worked out in a relaxed atmosphere. Second, they can be used to work out the derivations of results which otherwise obstruct the flow in regular lectures. Third, the idea of orders of magnitude of various quantities

Giving examples and solving problems is one of the best ways of helping students learn

involved in the lecture can be worked out. Lastly, challenging problems can be posed for the brighter students in the tutorial sheets.

I also like to modify tutorial sheets regularly. I often add the examination problems from the previous years to the tutorial sheets to upgrade them. In an introductory one-semester course, I like to give around one hundred problems in the tutorial sheets. Out of these around half are discussed in the tutorial hour and the rest are left for the students to work out on their own. I prefer to discuss the problems in the tutorial hour where I describe various *methods* of working them out, rather than providing the solutions. If the concept behind the problem is clear, the solution of the problem often becomes obvious.

I feel that the lectures and the tutorials must be so designed that they encourage students to read and think and not just to memorize. In science, knowledge changes at such a fast pace that whatever is being taught today, is likely to become obsolete after a few years. So it is better that the students get into the habit of depending on their own reading material to remain up-to-date. The teacher's role should only be to help them *develop a thinking process* so that they can *'see'* things.

Lectures and tutorials should be designed to encourage students to read and think

One often lands up with some difficulty when one finds that the course material is much larger than what can be covered at the pace that one desires. In such a case, I prefer to cut down the course material, rather than increase the pace of the lectures. I feel that it is better to cover a smaller number of topics that are properly understood by the students than to cover the full course. Such an approach poses no problem in the IIT system where the course content is flexible. At places where the course content is fixed, I prefer to leave the simpler topics to the students for self-study.

Preparation of lectures is an important aspect of teaching. I have found that no matter how well I know the subject and how often I have given the same lecture, I cannot perform well in the class unless I spend considerable amount of time the earlier night preparing the lecture. Preparing the lecture does not mean revising the subject. Preparation involves planning the flow of the entire lecture

such that it does not appear as disjointed clusters of information. The contents of the lecture should be linked to each other just like flowers tied through the thread in a garland. *The lecture must look like a story* where knowledge is revealed in such a way that every one is eager to know the next step. As one of my colleagues used to put it, *there must be a plot in the lectures*, the solution of which should be provided in the end. It is this plot which is created during the preparation.

The lecture must be well organized and planned. It must look like a story with a suspense-filled plot

I have to consult many textbooks to prepare a lecture. Often I have to make an effort to link two ideas, which prima facie appear to be independent. I have to think of what wrong ideas the students could have and how to convince them to accept the correct ones. For this, I have to often put myself in the place of students and ask questions to my own self.

I always prepare detailed notes for my lectures, giving the proper reference of books from where I have taken the material. After the class I note down any difficult question that was asked in the class and the answer I had given. These notes are very useful whenever I have to teach the same course again. I then know what the difficult part was so that I can prepare that portion better, either by adding more examples or by giving a more lucid description.

After the class, I note down any difficult question that was asked in the class, and the answer I had given. These notes are very useful when I teach the same course again

The job of preparing the lectures properly is difficult and time consuming, but it is important. The fact is that howsoever much one knows the subject, he or she questions it enough only while preparing or teaching it in the class.

The delivery of lectures is as important as the preparation. Every lecture should come from the heart of the teacher in clear words, full of enthusiasm. The teacher should have full concentration while teaching. I often compare teaching to

meditation. A good lecture requires a similar level of concentration. During the course of my lectures I feel like a musician who is giving a concert not only to please his audience but also to please himself. In fact, after a good lecture I feel as happy and relaxed as I am after a wonderful concert.

The delivery of lectures is as important as the preparation

Teachers should arrive and leave the class in time. Coming late or taking extra time does not go well with students. Teachers should also not miss the class unless it is absolutely necessary. If one has to cancel a class due to some important reason, the students should be informed earlier. 'No show' indicates a lack of seriousness on the part of a teacher. The teachers cannot afford to be less serious when they expect seriousness from their students.

Teachers should arrive and leave the class in time and engage their classes regularly. 'No show' indicates lack of seriousness

At the beginning of a new class I summarize what I have done in my previous lecture. When the students come to the class they may be thinking of different things, not necessarily about the lecture. Summarizing for two minutes at the beginning of the lecture helps to bring all the students to a similar mental level.

Taking lecture notes to the class is a well-accepted norm amongst teachers but it is better to glance through them only when needed. The questions from the students should always be welcomed and taken seriously, even if they appear to be silly. In fact encouraging questions from students goes a long way in developing a rapport with them. A good question should always be appreciated. If the teacher does not know the answer to a question, it is better to admit it honestly. It is not inappropriate to say that he/she would answer the question the next day after thinking over it. Students normally appreciate such honesty.

Often teachers come across a very difficult concept, to be explained to the students. Teachers should not try to avoid teaching it or giving a half-baked interpretation. They should face it and look for an appropriate way to explain it. It helps on such occasions to mention at the very outset that they are going to introduce a very difficult concept and full effort on the students' part will be required to understand it. This generally alerts the students and they become more attentive.

It helps to tell students to put in the effort to understand a difficult concept before beginning to explain it

I normally do not like to become examination-oriented in the lectures, even though many students like it. I never mention that a particular problem is important from the examination point of view, or that a question from a specific portion is likely to come in the examination. I prefer to be more knowledge oriented. Nevertheless, I do tell the students about the steps where they tend to make mistakes.

Having taught in an IIT, I have not come across rowdy students who would like to spoil a lecture just for the fun of it. But I have often come across those who shall ask irrelevant questions, more to show off. I have also come across students, who try to confuse you in the name of pointing out a mistake in the derivation where there is none. Teachers have to be careful with these type of questions. This is because when such questions are asked their minds could be wholly involved in the flow of the lecture and if they are not cautious, they may really begin to feel that they have made a genuine mistake and start correcting it. This can lead the teacher into a very messy situation. I have handled such questions by winning the confidence of my students by and large. I mention before I begin a long derivation that as my mind will be fully occupied in the delivery of the lecture, I could make a mistake. I request students to point out if I commit one. Now in case a student points out a mistake, I ask the others if the student is right. The other students always come forward to help lead me to the correct solution.

Teachers have to be careful of students who try to confuse them by pointing out a mistake where there is none

Positive body language and control on English adds to the value of a teacher. Some teachers speak with a touch of humor. Some others are serious but somewhat

philosophical. However, I feel that more than style, it is the content of the lecture which is more important.

Many students like to ask questions immediately after the class. Some others like to contact the instructor at a later hour. Teachers should be ready to solve their students' difficulties at any time. If this becomes too time-consuming, they can fix help hours. In some universities, faculty member are obliged to have office hours when they are available to solve the difficulties of the students.

I know that some teachers become a part of their students' lives. They try to help out students with their problems at every stage, even in their personal lives. In a way they become the parents of their students. This gesture has a far greater influence on the students' lives than just classroom teaching which is not remembered for long. The student may never use the subject that was taught to him/her in a particular class. But the personal rapport with their teacher is remembered throughout his/her life. Unfortunately, in these days of fierce competition and busy schedules, it is not often possible for a teacher to do parenting. But even if teachers do not do that, at least they can be kind to students, especially at the time of need.

Teachers should be ready to help solve their students' difficulties, even personal ones, at any time

It is not uncommon these days to find the use of multimedia facilities to deliver lectures in universities worldwide. In India also, it is becoming common to use transparencies and power point presentations in classrooms. It has a lot of advantages. The lectures can become very colorful and appealing. Difficult diagrams can be pre-drawn without wasting time in the class. Big derivations and long equations can be pre-written, without worrying about working them out on the board. Three-dimensional pictures can be scanned and presented.

These presentation methods are certainly excellent when it comes to giving scientific seminars. However, there are risks and disadvantages when these are used for teaching. The first disadvantage is that a teacher has a tendency of going fast with them. This means lesser time for students to take notes. Taking down

notes is important for students because during this time they are thinking about, as well as, grasping the subject. Limiting this time means giving them lesser opportunity to understand. Second, deriving important mathematical equations using transparencies can be very boring for students. Confidence is built in the students when algebra is worked out in front of their eyes on a chalkboard, keeping their enthusiasm alive. This is absent during teaching with slides. Another disadvantage of presentations is that they tend to make teachers careless. They may tend to avoid proper preparation of the lectures since all the material is pre-written. I have seen teachers who just read from their transparencies/slides, which is as bad as reading from the textbook in the class.

Use of multimedia has its advantages and disadvantages

I am very sure that if one has to use transparencies, one should write in them only the salient points, figures and equations. As a thumb rule, one should write only what he or she would write on the board while using chalkboard. Full sentences should never be written.

I have given lectures using transparencies and I find it convenient to teach with them, with at least the following advantage. Even though during my preparation, I have planned to discuss the various issues in a particular order and in a particular way, I know that I can never follow them exactly during the lecture. This could be because I am forced to advance the discussion on a topic while answering a student's question. Or it could be just because at a given instant, I find something more important than the other, and I decide to cover it earlier. In this change of order, there is a chance that I forget teaching some important topics altogether. Slides are helpful in remembering all the points to be covered. Similarly, if I have to make a long derivation in the class there is some risk that I may forget a key substitution and mess up my lecture. Hence much of my effort just before a chalkboard lecture goes only in ascertaining that I remember all its important points and steps. However, my mind is at peace if I have a set of transparencies/slides containing all the key points. Through the projection of

When and how to use transparencies

these transparencies, I can always bring myself back on track. Before a lecture, my mind is then occupied in the process of the actual lecture delivery, resulting in more effective teaching.

Thus teaching through slides can be useful in a sense and disadvantageous in some others. Depending on their own styles, teachers can adopt their own method. A combination of chalkboard and slides may also be tried. I have myself done chalkboard teaching for most of my lectures. However, one occasion where I always use slides is when I want to present in class, a realistic figure which is very difficult to draw on the board. I also use slides when I have to present big equations which need not be remembered by the students and whose derivations are not important for the theme of the lecture.

One of the common questions most young members of the Faculty ask in institutions like the IITs, is what is more important for them, teaching or research? This is a very difficult question to answer. Strictly speaking, teaching and research complement each other. Research is a creation, which is possible only with deep insight into the subject. This insight is a must for any teacher. Further, the logical approach of research helps in bringing out the points systematically in the class. In a similar way, the fundamentals that a person learns while teaching help him/her in understanding the research problem better. So ideally, a good teacher should also be a researcher and vice-versa. There should be no question of privileging one over the other. However, both these jobs are full time occupations and with the passage of time one finds it difficult to handle them together with equal devotion at the same point in time.

Teaching and research complement each other

I would not like to offer any suggestion on this issue because I myself love both research and teaching. I shall only mention the point of view that I have adopted. I feel that by teaching I am directly influencing the career of a large number of students so I have to take it seriously, even if it comes to teaching only a limited number of courses. I find it equally satisfying to see one of my former students climb the ladders of success such as when we publish an excellent paper.

Acknowledgements

I dedicate this small effort of mine to:

(i) My teachers who have made the student in me

(ii) My students who have brought out the teacher in me

(iii) My parents who taught me to look for weaknesses in my own self so that I could achieve high standards

(iv) My colleagues in the department who have mentored me and

(v) My family members who have always encouraged me.

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"Mindful mentors"

15

Good Teaching as an Attitude

N Raghuram
Biotechnology

I never realised that the Best Teacher Award of our university for the year 2004 would predispose me to unexpected hazards like having to write this book chapter on science teaching. It is one thing to do well in one's job and be rewarded for it based on confidential student feedback forms, but it is a totally different thing to put in writing the principles of good teaching in a manner that others benefit from it. This is because, I have known some teachers who hardly teach anything in the strict sense of the term, but still manage to inspire learning in the larger sense. There are yet others who do a seemingly impressive job, and yet have little lasting impact on student learning, if one defines learning beyond what is measured in our examinations.

A teacher with the right attitude makes a lasting impact on student learning

In my own experience, there is no single technique of teaching that works well with all the people for all the subjects/topics at all times. If there is one thing that always works, it is the attitude of the teacher towards the students, the subject and most of all, the profession. A teacher with the right attitude puts students' learning as the ultimate goal and will mix and match all the available

tools and techniques to suit the teaching-learning process unique to a given subject or topic or class. Therefore, I decided to refer to some expert recommendations based on research in science education, and combined them with my own understanding and experience in teaching bachelors and masters level courses in modern biology and biotechnology since 1997.

Some good teachers may be born, but most of them are made, as products of a good teaching-learning process. This is because teaching is not a job but an inspired profession or passion. Even a single inspired teacher, whether at school, college or university leaves a lasting impression on the minds of students, not only in terms of the knowledge and training imparted, but also the values of teaching-learning and professional pride, and inspires a few students to emulate their teacher and take teaching as a profession. Therefore, good teaching is necessary not only to prepare students well for whatever career they choose, but also to inspire some of them to take up teaching profession. Somewhere down the line, when they also cultivate the right attitude towards teaching, they will not only combine the "dos" and the "don'ts" from the good and bad aspects of their teachers, but also add value with their own innovations and conscious efforts.

Some good teachers may be born, but most of them are made

It is critical to realise that the importance of good science teaching is not just limited to those students who eventually opt for science-related careers. A rational approach and scientific temper is essential for every citizen in today's modern world. In the words of Nobel Laureate Bruce Alberts:

> "All the rest will become the citizens who determine—by their understanding and appreciation of the nature and values of science—both the vitality of our nation and the future of our scientific enterprise. It would be fine if all Americans knew about plate tectonics or the way cells divide. But it is much more important that they understand what science is (and what it is not) and how its central values—honesty, generosity and respect for the ideas of others – have made possible the rationalisation of human experience that underlies all human progress".

This is the biggest challenge for good science teachers, as they have to balance the task of inculcating core values of science with the demanding routines of lectures, completing the syllabi and exams.

There is no doubt that the quality of science teaching as an inquiry-based learning process depends critically on the teacher's own experience with the processes of scientific inquiry. Unfortunately, Ph.D. is the only stage when Indian scholars truly experience this, but this does not mean that every Ph.D. makes a good science teacher. We often put up with Ph.D.s who can't even communicate their own research properly to their colleagues, let alone teach concepts developed by other scientists in a manner understandable to students. Deeper scientific knowledge and research experience are useful, at times even necessary (at higher levels of education), but not always sufficient for good teaching of science. The fact remains that teaching is a skilled profession, and a teacher with the right attitude can easily acquire these skills, with or without a Ph.D. or a degree in education. For example, an aspiring good teacher who does not have experience in scientific research can always get a feel of it by having a stint with some practising scientists.

Surveys among students often reveal that the characteristics of good teaching include the teacher's enthusiasm or passion for the subject as well as scholarship, rapport with students in and out of the class, ability to motivate and stimulate learning, clarity and organisation in presenting conceptual and analytical understanding of ideas, and the ability to provide intellectual challenges to students. Different teachers use different means to achieve them, but it is possible to identify some general teaching styles: *subject-centered teaching*, in which the course has a fixed structure, *teacher-centered teaching*, in which teacher adopts the most convenient mode of teaching that suits him/her, and *student-oriented teaching*, in which the learners' needs and the learning process define the whole style of teaching.

Good teaching is about passion for the subject, scholarship and rapport with students

All these styles may produce equally good results in terms of the students' performance in exams that test factual knowledge. However, *student-oriented teaching* in discussion mode often leads to better retention and application of knowledge

and its better application to other situations, apart from better motivation for further learning. Even if practical constraints force us to adopt different teaching styles at different times, it is useful to try student-oriented methods whenever possible. I have tried the discussion mode successfully in my classes on bioethics, bio-safety and intellectual property rights, especially since students tend to regard these subjects as peripheral to their learning needs in biotechnology. Discussions not only keep the students alert and engaged, but also improved their perception of these subjects and attendance in my classes.

Teaching through discussion leads to better retention and application of knowledge

The choice of teaching style depends critically on the intended learning goals. The current practice in the West, especially the US, is to clearly spell out the learning goals in the syllabi, in the textbooks as well as in the evaluation of students. While it may take time for these practices to enter the Indian educational routine, individual teachers would benefit immensely by asking themselves in advance: What do we want our students to learn in a particular course/subject/topic/class? Are they concepts, factual knowledge, memory, practical skills, analysis, inductive or deductive logic, interpretation, problem solving, articulation, rational approach, team spirit, life skills or better citizenship.

As teachers we should ask ourselves what it is that we want our students to learn in our course?

All these goals are important for learning in the larger sense of the term, but most often the course requirements are such that some goals may be more critical or more achievable than others, or they may be needed in different combinations. A little advance thought on learning goals immediately puts the entire teaching plan and choice of teaching methods in context. For example, the learning requirements are best met when equations are solved on the blackboard, and when three-dimensional structures of biomolecules are shown as toy models or projected on a screen, preferably with animation. Similarly, a demonstration or simulation may help in understanding the underlying principles or methods, but hands-on experimentation is the only way to acquire the practical skills needed

to be able to carry it out independently at a later stage. In addition to learning goals and student needs, other factors that should be borne in mind while choosing teaching methods include student backgrounds, their prior knowledge, preconceptions and misconceptions, their learning styles, class size, infrastructure and logistics.

Teaching methods should suit students' backgrounds, knowledge, and learning styles

As regards good teaching practices, a typical class room lecture with the help of a blackboard is often the most convenient, time-tested and most practical method, but it can be converted into a good teaching-learning exercise with a few simple practices: Always plan your lecture in advance, make yourself aware of the students' prior knowledge and identify the major and minor concepts or learning goals and the connections between them to help you with the planning. Always begin the class with something familiar or important to the students.

Face the students and maintain eye contact, move around a little bit, speak loudly and clearly and vary the tone of the speech intermittently. Pause frequently and assess whether the students are in tune by asking questions or prompting them to ask, or involving them in discussions, using paradoxes, puzzles and apparent contradictions to engage students, especially the dull, distracted or naughty students. Focus on interactive learning, and never hesitate to say "I don't know", or "I wish I knew" or "We need to look that up—why don't you do that and tell us all in the next class?"

Teachers must maintain eye contact with their students

Also do not hesitate to carry the textbook or your teaching plan to the class or to refer to them during the class. Never dictate notes or encourage students to note down your lecture verbatim, but tell them if you want them to note down something specific, and teach them how to make notes from books.

Plan the content and pace of the lecture keeping in mind the weakest student of the class without boring the brighter ones and vary the content and pace during the class if necessary. Use charts, models, transparencies, slides, powerpoint projections or videos wherever necessary and possible but don't become dependent

on them entirely (what if power fails?). Use the blackboard frequently, but only to write important terms, structures, equations, diagrams or concepts that you want to emphasise, but not sentences or paragraphs, and make sure that you wipe the board clean before and after the class. Always try and relate the lecture contents or examples from foreign books with examples from your own country or city, including linking them to daily life situations or reports from news media. Stick to the medium of instruction to the maximum extent possible and always encourage students to communicate with you in the medium of instruction (for example, English), but make sure you do not put off students who have language-related difficulties in learning or communication.

Plan the content and pace of the lecture keeping in mind the weakest student of the class

The main purpose of textbooks and audio-visual tools is to enhance learning. To that extent, use them as students' learning aids rather than as teaching aids for your convenience. If you are more specifically interested in instructional resources other than books, there are instructor's manuals, CDs and transparencies available for certain subjects, including biochemistry and molecular biology. A simple search on www.amazon.com will help you locate them, if your library doesn't have them. Avoid repeating everything in the textbook and leave something for the students to figure out, add your own insights from other books or your experience and make sure you are above the textbook in your students' perception. Always provide references or handouts in addition to the prescribed textbooks to encourage additional reading.

Add your own insights from other books or your experience to textual material

The use of audiovisual tools doesn't automatically improve learning, even if it makes teaching more convenient. Moreover, well-crafted presentations may run the risk of emphasizing the teacher's delivery rather than student learning. I have always preferred using the blackboard for its sheer simplicity and convenience, but have often felt guilty for not taking the trouble of making slides or transparencies. Once I offered to use transparencies or slides to enhance the pace of my teaching in a microbiology course to complete the syllabus in time, but

my students opposed the idea vehemently, saying that they are bored of some of their teachers copying entire sentences and paragraphs from textbooks onto transparencies and reading them out in the class. The students could not keep pace with the projections or take notes, nor did they have a feeling of communication with their teacher. I would have never used transparencies that way, but decided to go with the students' sentiments, as they agreed to attend extra classes to allow me to complete the syllabus at my own pace using the blackboard. This experience confirmed my long held suspicion and exploded the myth that teaching aids automatically enhance learning. After all, aids are only as good as the teachers who use them. Good teachers master their aids to enhance learning, and bad teachers become the slaves of their aids to cover up their deficiencies.

The use of audiovisual tools doesn't automatically improve learning

Good teachers use aids to enhance learning, not to cover up their deficiencies

If you want to use audiovisual aids as a good teacher, never produce entire paragraphs on your slides—only brief points and visuals like tables, graphs, photos, diagrams etc; don't darken the room as students can't take notes, never read from the slides or transparencies and never lose eye contact with the students—which means you should memorise what is on your slides/transparencies. If you are not sure about organising your presentations, do a google search on the internet to locate the faculty websites of the best known American or European universities in your subject, and browse your way to the presentation materials that many of their teachers make freely available on the web, but use them only as guidelines to design your own presentations in accordance with your students' unique learning needs.

The learning attitudes of students towards science depend not only on the preparation of their teachers, but also on the students own beliefs and superstitions. They can often be the biggest barriers to learning scientific concepts and even more importantly, scientific temper. The main difference between science and (religious or other) faith is that science accepts only what can be proven, but

faith demands you to accept everything that cannot be proven, without a question. But we often fail to convey this effectively to our students, which is one of the reasons why even some of our best science students do not necessarily rank well in terms of scientific temper. The general tendency to teach scientific concepts as a set of established truths makes them no different from socio-religious teachings of faith, unless teaching scientific truths includes giving a flavour of how these truths were established and others were rejected.

Students' attitudes towards a subject also depends on their own beliefs

The best way to teach scientific concepts is to focus on knowledge as an outcome of a process of inquiry, rather than just as a product. Even when we do this, we must remember that the learning of students may be impeded by their prior conceptions and misconceptions. Identifying them can help us in removing the barriers to their learning. They include *preconceived notions*, such as underground water must flow in streams because it does so on the surface; *nonscientific beliefs* such as creation as the basis for life and "dashavataras" (the ten avatars in Hindu mythology) as a proof of evolution; *conceptual misunderstanding* that arise out of a confusing mix of scientific concepts and prior notions, *vernacular misconceptions* that arises from the use of terms that mean one thing in science (for example work as in physics) and another thing in daily life; and *factual misconceptions* that are based on falsities learnt during childhood but retained unchallenged into adulthood.

The best way to teach scientific concepts is to focus on knowledge as an outcome of a process of inquiry

Knowing our students and their attitudes to science can tremendously enhance the quality of our teaching. Remembering the names of all the students, as well as having an idea of their socio-cultural and other backgrounds is of immense help in building the right level of rapport needed for an effective teaching-learning process. I haven't been very good at remembering names, but I try to ensure that it doesn't come in the way of building a good rapport with my students, at least till I improve on this count. If you are teaching in a metro city, it is also important to remember that the students in your class tend to be from diverse cultural,

religious, linguistic and socio-economic backgrounds and that there can be different barriers to teaching and learning among different students. For example, it is a common misconception (among teachers and students alike) that assertiveness, outspokenness and competitiveness are indicators of a students' interest or mastery of the subject, and *vice versa*. These are often conditioned by upbringing, but can be changed by a perceptive teacher.

Make efforts to build a rapport with students

In our intense preoccupation to teach our own subject well, we often also overlook the students' overall understanding and attitude towards science and scientific activity. It may be very useful to occasionally seek answers from students to questions such as: What is science? How do the scientists do it? What is meant by scientific thinking? How do scientists test the validity of their work? How do scientific discoveries or scientific thinking help (or harm) society? How do scientists help protect society from the abuse of science or technology? Some of their answers might surprise you and prompt you to rethink the way you approach your teaching of science.

Also take frequent informal feedback from the students regarding the subjects you teach and your teaching style and use them to introduce changes in your teaching methods. At the end of each course, ask yourself simple questions like: How satisfied am I with this course? What are the strong points and weak points of this course? What did I find most interesting and most frustrating about this course? What would I do differently if have to teach this course again? Also take a formal feedback from students based on a suitably designed and confidentially administered questionnaire in the middle or end of the course. The questionnaire that I have designed and used in the last few years is provided for reference.

Take formal and informal student feedback frequently

Finally, it is extremely important to recognise that good teaching by an individual teacher is just one of the many links in the overall system of education, lest we blame teachers for everything that is wrong with our education. It also

depends on a whole gamut of systemic issues including educational policies, recruitment and faculty development programmes, good administration, infrastructure, curriculum, teaching aids, fee structure, examination learner-friendly environment and the attractiveness of teaching as a profession.

I took to teaching profession by choice, leaving more glamorous and better-paid jobs in the industry and media. I have no regrets for my career choice, but I am pained at the declining popularity of teaching as a profession, not only among the students that we produce, but also among parents, scientists, society, and the government. The teaching profession today attracts only those who have missed all other "better" opportunities in life, and is increasingly mired in bureaucratic controls and anti-education concepts such as "hours" of teaching "load", "paid-by-the-hour", "self-financing" courses, "contractual" teachers etc.

With privatisation reducing education to a commodity, teachers have been reduced to tutors and teaching has been reduced to coaching. The consumerist boom and the growing salary differentials between teachers and other professionals, and the value systems of the emerging free market economy have made teaching one of the least attractive professions that demands more work for less pay. Yet, society expects teachers not only to be inspired but also to do an inspiring job! Therefore, aspiring good teachers have the added responsibility of asserting the value of their profession and the importance of other inputs that make good teaching possible. It is also equally true that if our teachers don't react to politicians playing with our courses or projecting astrology as a science (just to cite an example), it doesn't matter any more whether they are good teachers. Therefore, good teaching is not just a recipe of do's and don'ts, but an attitude and once you acquire it, it reflects itself in many ways, both inside and outside the class.

Good teachers have the added responsibility of asserting the value of their profession

STUDENT RESPONSE SHEET FOR N RAGHURAM
School of Biotechnology, GGS Indraprastha University, Delhi.

Instructions: This response is meant to be confidential. Please answer all the queries honestly and objectively, and mark 'NA' if not applicable. Thanks for your cooperation.

Course Particulars:

Course code & Title	Theory / Practical	B.Tech / M.Tech Semester	Academic Year

Student Response

1. Approximate % syllabus covered in the class:
   a. ~100% b. Above 75% c. Above 50% d. Above 25%
2. Compliance with the no. of teaching hours allotted and actual hours taught:
   a. ~100% b. Above 75% c. Above 50% d. Above 25%
3. Were the lectures usually relevant to the actual syllabus:
   a. Yes, quite b. Adequate c. Sometimes d. No
4. How did you find the pace of teaching?
   a. Just right b. Too fast c. Too slow d. Uneven
5. Clarity of speech:
   a. Quite clear b. Somewhat unclear c. Variable d. Not clear
6. Logical flow and continuity of thought and expression
   a. Good b. Adequate c. Variable d. Poor
7. Organisation of lectures in terms of content, preparation and depth
   a. Good b. Adequate c. Variable d. Poor
8. Use of blackboard and/or teaching aids:
   a. Adequate b. Too much c. Variable d. Too less
9. Did the lectures generate enough interest and help in developing new concepts?
   a. Always b. Often c. Sometimes d. Never
10. Balance between basics and latest advances in knowledge
    a. Adequate b. Often too basic c. Often too advanced d. Uneven
11. Balance between concepts and the methodologies behind them
    a. Adequate b. Often too basic c. Often too advanced d. Uneven

12. Were questions encouraged in the class?
    a. Always b. Often c. Sometimes d. Never
13. Readiness, honesty and accuracy in handling questions in the class
    a. Very high b. Adequate c. Variable d. Poor
14. Was the teacher readily available for interaction/guidance outside the class?
    a. Always b. Often c. Sometimes d. Never
15. Were reading lists/references provided in the class?
    a. Always b. Often c. Upon request d. Never
16. Were the suggested reading materials accessible/available and useful?
    a. Yes, always b. Often c. Sometimes d. Never
17. Do you think attending these lectures will help you to tackle your exams and fulfil your career goals?
    a. Yes b. Often c. Sometimes d. No
18. How do you rate your own attendance in this part of the course?
    a. ~100% b. Above 75% c. Above 50% d. Above 25%
19. What proportion of the allotted practicals was actually (and effectively) conducted?
    a. All b. Most c. Some d. None
20. Was the teacher available, helpful and useful in enhancing your practical skills?
    a. Yes, always b. Often c. Sometimes d. Never
21. Overall, how do you grade the relative teaching performance?
    a. Excellent b. Good c. Fair d. Average e. Poor

Course Design Feedback

22. Was this part of the course relevant to your concept development and career needs?
    a. Yes, quite b. Adequate c. Sometimes d. No
23. Were this set of practicals relevant to your skill development and career needs?
    a. Yes, quite b. Adequate c. Sometimes d. No
24. How do you rate the overall content and structure of this part of the curriculum?
    a. Excellent b. Good c. Fair d. Average e. Poor

Nandula Raghuram is currently a Reader in Biotechnology in GGS Indraprastha University, Delhi. He had a stint in industrial R&D and science journalism before joining as a lecturer in the University of Mumbai. He received the Best Teacher Award *in 2004. The author can be contacted at raghuram98@hotmail.com; raghuram@ipu.edu*

WISDOM WARRIORS

17

Teaching is an Art

Sampat P Singh
Financial Management

Starting in 1950 I have taught at the University of Allahabad, the National Institute of Bank Management and the Indian Institute of Management, Ahmedabad, for almost an equal number of years in these three centres. First, it was economics, then financial management, and, finally organisational leadership. For me education has been a vision and teaching a mission dedicated to knowledge and spirit of enquiry. As a corollary teaching has not been a job but a commitment to excellence. All through the feedbacks, the recognition and the esteem I have been receiving from my students have given me feelings of self fulfilment, satisfaction and joy. For me teaching has been an art, and, to put it more clearly, a performing art. Therefore, in playing the teacher's role the problems are related to the fundamental issues of life. Two elements are critical. One is beliefs, values and ideals of the role player and the other is the situations he/she faces at different points in time.

Two elements are critical for the role a teacher plays

For narrating my experiences as a teacher I should better start with my life in the years when I was a student. My teachers felt I was a good student. But my

performance in the examinations was not very outstanding. Perhaps, I was instinctively not inclined to focus almost exclusively on the prescribed courses of study. Emotionally, I was attracted towards drama, debates, writing essays, and, sports. I developed a literary taste, intellectual interest and the habits of buying and reading books from literature, history, philosophy and spiritualism.

Unconsciously, I was being driven towards the development of a broad perspective on life and versatility. Extracurricular activities had their payoffs. Debating developed the habit of forceful speaking. Acting on the stage resulted in the abilities to stand firm on feet, and, easy and purposeful movement from one spot to another in the classroom; to use hands and face for expression through gestures; to use voice modulations and pauses for effective communication; and, most importantly establishing rapport with the audience. It helped me in making my presence felt and capturing the full attention of students. Participation in sports developed courage to face challenges and fight my way out.

It was somewhat unusual that till graduation I did not think of my choice of a future career nor working for achieving the goal. Perhaps I was living in the belief that goals evolve. An event proved to be the crucible of my life.

The General English examination for graduation was in two parts: oral and written. The *Viva voce* at that time at the University of Allahabad was given great importance and weightage. Our external examiner was N K Siddhanta who later became the first Chairman of the Union Public Service Commission of India. The interviews were on and we were standing in the verandah. My roll number was 42. The peon came out and announced that the examiners had to attend a function and only students with roll numbers upto 40 would be taken up that day.

When one becomes a teacher without planning for it one should draw on existing skills and strengths

I was tense. This *viva voce* was going to be the first experience of my life. There was the fear of the unknown. The announcement made me feel relaxed. A little later the peon called for roll number 42. I rushed up to him and he just pushed me into the room and I saw myself facing the examiners. Siddhanta asked me

which of the three books prescribed for the written examination I had studied. Most of the students had been telling him they would do that during the gap period of three weeks. My answer was that I had read all the three books. The examiner looked surprised and asked whether he could question me on any book. I replied yes. He gave me the choice and I opted for *Democracy and Its Rivals* by Christopher Lloyd. He asked: What is democracy?

Some of the students had mentioned this book and were asked the same question and all of them had mentioned the popular Lincoln definition: a government of the people, by the people and for the people. My reply was democracy is anarchy by delegation. The examiner was again surprised and asked who gave this definition, and, my reply was Harold Laski. The next question was in which book did the definition appear and my reply was in *Grammar of Politics*. I was further asked: have you read the book and some other books by that author. My reply was yes. The examiner was all the more surprised because I was not a student of political science.

A broad reading base could be one such skills

I was awarded marks which turned out to be an all-time record. The result was an image amongst fellow students. Some teachers took special note of me and in my postgraduate days gave me chances to dictate their notes to my class in their absence. It went very well on all occasions. They felt I had the potential to become a teacher and encouraged me. I too for the first time thought that it was the right choice of a career for me.

It so happened that soon after my postgraduate days there was a temporary leave vacancy for a lecturer's post in the University and on the recommendations of my teacher-mentors I was given the opportunity to teach.

The Head of the Department was a terror. As a courtesy I went to meet him. Before I could fully cross the threshold he shouted: go and meet the head clerk. I was given a slip to sign as the joining report. I asked the old man: what should I do next. He gave me a copy of the class schedule and an attendance register and told me to go to the class, take attendance, the rest will follow. I prepared for the

class and did that the next day. It worked. Soon there was talk about my classes amongst students. I was getting very good feedback.

Slowly I started developing my interpretation of the art of teaching. My main findings follow.

- There is a difference between teaching and making a presentation. My aim was not merely to impart knowledge; my effort was to be to promote better understanding.
- I would not let my classes be boring. I would try to make difficult ideas look easy and generate interest for the subject amongst students through anecdotes and occasionally use humour to release tension.
- I would work hard, prepare notes and take them to the class but not use them there. The idea was to fully rely on memory and maintain spontaneity of flow.
- My aim was to master the art of teaching and excel.

Most of my colleagues did not like my joining their clan because I was neither a gold medallist nor a doctoral degree holder. My reputation as a teacher generated envy. All this did not affect me as I took it as part of life.

As I have by nature been innovative I very soon worked out a new design for the course I was teaching. Some very senior colleagues who liked me showed it to the Head of Department. I was asked to redesign all the courses taught in the Department. I slogged and did the job. But it annoyed most of my colleagues. It did not affect me again. By nature I have been a loner and enjoyed working on my ideas with passion and commitment.

A teacher's role must not be confined to teaching the prescribed course. My experience was telling me that I could do my best in the classroom when I was teaching a course designed by me, particularly a new one, and with the help of teaching material selected and prepared by me. After a few years I designed an entirely new course. For it I worked

A teacher's role must not be confined to teaching the prescribed course

on more than 500 articles in journals and selected an anthology of 21 articles which was published under the title *Economics of Underdevelopment* by Oxford University Press in 1958. Soon similar courses were introduced all over the world and this book was used as a textbook.

In the early sixties most of my time was spent on introducing the Master of Business Administration program at the University of Allahabad. Amongst the many other problems of launching the program, (one) was who will teach quantitative techniques. I volunteered and worked hard to learn sets, vectors, matrices, calculus and probability. One of my teachers had once told me that if you want to learn something then teach it. I found it worked.

Research is also an integral part of a teachers' role. Early in my career I worked on several research projects. Some of them were funded by the Planning Commission and the University Grants Commission. This experience helped in enriching my teaching efforts. However, I was always clear in my mind that my primary interest was teaching, not research.

Research is also an integral part of a teacher's role

During this period I received the Ford Foundation fellowships twice. First I was at Stanford University to attend a one-year programme for specialisation in Financial Management, and, then at the Harvard Business School to attend the International Teachers Programme. These experiences broadened my perspective. I had also the opportunities to work closely with two top professors of Finance: Pearson Hunt and Ezra Solomon and to learn how to write cases and use the case method of teaching. Also I could work on two research projects in the US.

Then came the next phase of my career. After two decades at the University of Allahabad I shifted for next two decades to the National Institute of Bank Management. I wanted to have the experience of teaching practising bankers, and, to have a close inside look at Indian Banking.

A teacher must accept the challenge of teaching a variety of groups

NIBM was a new institution. Those faculty members who had joined before me believed that a man like me with a university background was not fit for management education. Moreover, being a loner I did not try to socialise or mix with others.

Soon there were two management education programmes for bankers organised by NIBM at Pune. I was to go as observer to familiarise myself with the Institute's programmes. As I was travelling in the train from Mumbai to Pune with five other faculty members who were going to teach in the program, one of them came and took the vacant seat by my side and said "Professor, would you inaugurate the first program tomorrow". I could see his mischievous intention, and, promptly responded: "I would inaugurate only if I am also given some sessions to teach". He was surprised by my countermove, but he readily agreed perhaps feeling that I had been trapped. I did what I had agreed to do. I got from the participants good response because as a teacher I could establish full rapport with them.

This proved to be an excellent learning experience for me. I could see practising bankers were focused on their day-to-day problems of banking routine, procedures, rules and guidelines, and, getting the cooperation of staff. On the other hand, with fast growth, big and complex managerial problems were coming up and they had to be solved. The faculty felt bankers were not willing to learn modern management techniques. The bankers felt that the faculty had no idea of banking practices and were not telling them how to use new knowledge to solve their problems.

The problem was of the creditability gap. The faculty had to be fully familiar with banking practices to solve the problem of relevance, and, the bankers had to understand that the application of new managerial techniques was largely their problem. I remember once in the class a banker kept insisting that he was facing a practical problem and he wanted me to give the solution. I asked him to come with me out of the class for a minute. There I told him you have paid the fee to attend this management development programme, you pay me my consultancy fee I will come to you,

Teachers must be fully familiar with the practical aspects of their subject

look into all the facts, and solve your problem. We came back to the class. He understood the difference between teaching and consultancy. Sometimes, it becomes necessary for a teacher to take a stand and put issues in the right perspective.

Professional rivalry is part of life. It has always helped me to try with more imagination and commitment to meet the challenge and excel. To do that I took my preparatory work seriously.

First, I worked in the afternoons for six months at the Princess Street branch of the Union Bank of India. My idea was learning by doing. Koyna, the Manager, helped me work on all jobs and reach a stage where I could communicate with the bankers in the class in their language, and, with confidence.

Second, as an academician I took up research on systems, procedures and related decision processes in the area of bank credit. It included the study of literature published on the subject over the past 300 years. Simultaneously, I also started looking at the credit files. Ranade, as the manager of the biggest branch of Bank of India, gave me access to the files and deputed Poduval, an officer, to help me in answering my questions. This helped me develop expertise in my area of specialisation.

Third, I started writing my own cases for use as teaching material in the classrooms. My experience has been that I did better with my own cases. Moreover, the ability to teach a case develops with repeated usage. Once I discussed my case "Fancy Wear" with the branch managers at Bank of India's Staff College. After two years I was invited again and I sent the same case. I was told that some of the branch managers who attended my class earlier have now after promotion come again for regional managers' programme. I said it would not cause a problem. Kalyanpurkar, the Principal, who used to sit in my classes told me after the class that I had changed the entire approach the second time. The teacher also learns and interpretations can be more than one.

Teachers can design their own teaching material

Fourth, I started publishing books and articles in journals and financial dailies on various topics in the areas of my interest and used most of them as teaching material. My experience also suggests that writing helps in promoting better understanding of what one is writing about.

Fifth, all my activities were giving me credibility as a teacher and as an expert in my area of specialization. As a result I got the unique opportunity to serve on more than a dozen committees appointed by the Reserve Bank of India, starting with the all-time famous Tandon Committee. Participation in public policy formulation at the national level is also a rich source of experience for a teacher.

A teacher has to earn credibility as a subject expert

Sixth, all through my aim was to work for change in all processes related to bankers' credit decisions. I wanted them to be based mainly on financial information and analysis and used education as my primary instrument.

In 1982 I was invited to teach as Visiting Faculty the required course *Finance-I* in the First Year of the Post Graduate Programme (PGP) at the Indian Institute of Management, Ahmedabad (IIMA). To start with I had to face professional rivalry and competition. I was given one section and the other two sections were to be taught by the Institute's own faculty. In the beginning I took time to settle down in the different environment. By the third year I was formally recognised as the best teacher by the students and given two sections to teach. Sometimes I taught all three sections.

Learn to face professional rivalry by giving your best performance

Teaching this course for about 15 years has been the most rewarding experience of my life as a teacher. The students were a select group. They could be forced to work on assignments and interact in the classroom. I also followed the practice of sitting in the classes of my co-instructors and welcomed them to sit in my classes to ensure uniformity of approach in all three sections and to learn from one another. Additionally I was experiencing that the teacher also learns as a result of interaction with the students in the class.

The cultural environment at IIM-A was positive. A good teacher was admired by the entire campus community. I never felt I was an outsider, and was invited to the Area and Faculty Council meetings which I sometimes attended but preferred to maintain discreet silence. Since I had to stay on campus away from my home I could use all the time to work hard.

My approach for practicing teaching as an art was clearer to me now. First, I worked thoroughly to prepare myself for the next class. In line with the practice at IIM-A I relied mainly on the case method of teaching. All possible calculations in the case were meticulously done and checked more than once. Decision related issues were anticipated and answers thought out. I worked out how I will start and how I will finish a class. The idea was to move from simple to complex. Second, I never permitted boredom to set in. I used wit, humour and anecdotes to keep up the interest. Third, I could modulate my voice and communicate not only the message but also its meaning. Fourth, I encouraged students to put forth their interpretations, and, more importantly to raise questions. Fifth, I was full of confidence that I knew my subject. My reflexes were quick and I could grasp the questions promptly and come out with spontaneous responses. If I found a question flimsy I would quickly shoot it down. However, if I did not have a ready answer to the question I would promptly say that. Taking a wrong stand results in meaningless discussion. The class always moved at a fast pace.

Prepare thoroughly for every class

Use wit, humour and anecdotes to prevent boredom in class

Good body language and self-confidence give a teacher advantage

I was due to retire from my post at NIBM in 1989. Therefore, in anticipation I started increasing my work load at IIM-A. First, an elective course: *Management of Financial institutions* was offered for the PGP second year, and, then an entirely new course: *Leadership—Vision, Meaning and Reality* was also offered as an elective

to them. In both cases the registration was high. Two sections had to be run. My teaching load at IIM-A became more than that of any other faculty member.

The course on Leadership was the first of its kind in India and second in the world. The approach was subjective, not objective. My stand was: crucial issues of Leadership are fundamental issues of life. For example, courage. Its meaning can be understood better by using masterpieces of literature as teaching material.

I do not know what the experts have to say about the techniques and skills of teaching. It is an art and has to be learnt the same way as an art is learnt. For me every class was a challenge; a few failures never disheartened me. Some instances can be cited to further elucidate my approach.

Teaching is an art that has to be learnt the same way as any other art

- Once two faculty members at the IIM-A came to meet me after dinner. They had started a programme for IAS officers and said that none of the three faculty members was allowed to proceed with his session by the participants and asked me to take the first session next day. When I walk to the class, even now, I feel nervous. My palms perspire and I use the toilet on the way. But once I am face to face with the class I am fully confident. The participants listened to me on banking policies with rapt attention. At tea break some of them were heard saying: he knows his subject.
- After discussion on a credit decision case in finance when the class was over a student came to me and said she felt as if the borrower and lender were talking to each other in this session and negotiations were really going on. In teaching dramatising the decision-making process helps. Credit decisions are based on negotiations. When students are seated face to face in the class in semicircular rows it oftentimes becomes possible to encourage those sitting on one side to speak on behalf of the borrowers and those sitting on the other side to speak on behalf of the lenders. Continuous questioning by the instructor makes role playing

Use games and role plays to teach abstract concepts

gather momentum. The final result is active involvement of students in the learning process.

- In another finance class I had finally worked out the cash flows on the blackboard. The time was up and the students had started getting up. Suddenly a student in one of the back seats said: there is double counting in cash outflow for account payables. Nothing could have been achieved at that time by entering into an argument with lots of students surrounding me. Spontaneously I shot back: I give you 24 hours to prove it. Next day as I looked at the student he said: I have checked the calculations they are okay.

Manage students skilfully

- Once I gave the draft of a chapter from my forthcoming book on Leadership to participants in the Management Education Programme at IIM-A to read and discuss in groups and prepare for presentations next day on their understanding of the issues covered by me. They were ready for presentations in the next class. Instead I asked them to reread the chapter with me. I read loudly and they followed me silently. The reaction in the end was: we would like to revise our write-ups for the presentations. Modulation of voice and pauses convey meaning.

Voice modulation and pauses add value to the lecture

- When Pradip Khandwalla was the Director at IIM-A, a brochure was published for sending to corporates as part of fund raising activity. It contained one photograph of a PGP class in progress with me as the instructor. I was told it was selected because the eyes of about 70 students were focused on the instructor. Rapport and attention are important.
- After reading my book *Leading – Lessons from Literature*, a former student wrote to me stating that the book contained much of what we had talked in the class, but he missed my presence and voice.
- I have never used communication gadgets. They disturb eye to eye contact between the teacher and the students. It has always been chalk and talk. I

feel a sense of fulfilment when questions like: Can ideals be achieved is raised, and, I spontaneously answer: Goals are achieved, ideals are pursued.

After 55 years of work in classrooms I had to stop. Due to failure of eyesight, I could no more read and write. When I could not do that I could not teach either. In the end, let me add, I have tried to narrate my experiences as a teacher, and not to lay down guidelines for others. I have been a teacher, not a preacher.

Sampat Singh was educated at Allahabad, Stanford and Harvard. He has taught at the University of Allahabad, NIBM and IIM – Ahmedabad. Famous as an expert in banking and finance, he played an active role in formulation of national policies and has authored many books and papers. He is a very famous teacher.

Master Minds

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Sharing Happy Hours

Nalini Swamidasan
Logic, Philosophy

When I decided to teach in a college, in a way I continued a game I loved to play as a child. My younger sister, her friends and I played a game of teacher and pupils, with me as teacher and my sister as a naughty, irrelevant pupil of the class. One of the subjects I loved best to teach was "Picture Composition". A picture was shown to the pupils and they filled in the blanks in the given sentences, answered a few questions and wrote a note or a story about the picture. All of us, the teacher and the pupils enjoyed the activity, even my sister. Much later I learnt a valuable lesson from this play activity. Children especially, but college students too, learn quicker and better, when a sense of achievement is promoted in the process of learning and when the process of teaching itself is enjoyable, for both the teacher and the taught.

An essential factor of successful learning is the sense of achievement promoted in the process of learning. The process itself in a sense has to be enjoyable for both the teacher and the taught. Rigorous analysis and explanation, formulae and their applications,

An essential factor of successful learning is the sense of achievement promoted in the student

complicated problems and their solutions in advanced level courses may not appear at first glance as material for enjoyment. But all learning if it is successful in stimulating and influencing the learner has to achievement-enjoyment oriented.

One of the first tasks I had as a lecturer was to plan the number of lectures to be allotted for each of the topics in the syllabus. The first subject I taught (52 years ago) was Logic – Deductive and Inductive for Intermediate Arts of Bombay University – 2 papers each of 100 marks. My professor and friend (and later my husband) helped me organize the distribution of lectures and the planning of the first few lectures. I wrote down the entire lecture – how I was to begin Lecture I, when to quote a few lines from a poem or an author, even when to pause and crack a joke – everything was planned before hand but given an air of spontaneity. Every part of the lecture was almost rehearsed – the fun part too. There is nothing like a little fun together to bring the class together, be it my classes of 150 and more at Sophia College, Mumbai, and classes of 60 at first and later of 120 at IIT Bombay.

The first task of a lecturer is to plan the number of lectures for each topic in a course

I tried to do this kind of preparation for every new class I met every year and every term/semester during my 37 years of teaching undergraduate and postgraduate courses. The course content and the format of lectures changed with every passing year; first because I moved from teaching Arts students to teaching Science and Engineering students, and of course because I read more. I always kept my lecture/ lectures ready well in advance; If not the entire lecture, at least the framework. I also needed to be focused on my lecture before I entered the classroom. So I avoided company and casual conversation quite some time before the classes began.

A teacher must keep her lectures ready in advance

During the lecture I encouraged questions from students and always provided time for interruptions. The lecturer is at times not clear

Encourage students to ask questions

enough or is too fast. A particular student's difficulty is often faced by others too. I found it rewarding to stop and answer the interruption. It gave me the opportunity to ask the student her name (or his name as it often was to be at IIT Bombay).

Within a few weeks, I got to know several students in the class. It is easier to communicate with a group one knows, than with an anonymous audience. A rapport is built when one knows them as persons. A teacher quickly learns who are the habitual attention seekers and also those whose difficulties need to be attended to, perhaps outside the lecture room. I never grudged students time after class in college corridors or in the common room. They were always welcome to meet me in my faculty room. Many of these sessions were a learning for me too. As a teacher I remained a participant in the learning process. A teacher has to remain a learner. Learning and knowledge never end. My students and I discussed issues and analyzed concepts. We suggested books for further reading and lent one another books.

A teacher should get to know the students. It is easier to communicate with a group one knows

I never read out my lecture from the notes. I spoke to the class and only dictated from a book or my notes when a quotation was long and had to be precisely written down. One should not hesitate to repeat an explanation or a statement of information, a definition or an analysis of a concept. In fact, repetition is often necessary to help the student to absorb and consolidate what is taught.

A teacher must never hesitate to repeat an explanation because repetition helps students absorb ideas better

Though all good lectures share some common features – clarity of thought, lucidity of expression in words/ symbols, the introduction of the new in terms of what is already known, the summing up of salient points and so

There are differences in handling the material as much depends on the kind of subject taught

on–yet there are differences in the handling of the material as much depends on the kind of subject taught. Whether the subject is mainly factual like the sciences, physical, biological and social or is it mainly a study of ideas, words, feelings expressed in language as in the humanities, (for example, philosophy and literature), determines the techniques and tools used. Mathematics shares with the humanities the nature of the input it requires for teaching, namely - books and journals—and at the same time has applied mathematics as an integral part of engineering and the sciences. The interdependence of areas of knowledge is best seen in interdisciplinary subjects, for example, archeology which depends on history, geology and chemistry (to name just a few). Moreover, the sciences and science-based areas like engineering and medicine need laboratories and equipment, workshops, hospitals, fields for survey, etc.

While referring to differences in the techniques and tools for teaching, I am aware that in today's world the dissemination of information is very effectively facilitated by technology in all areas of learning. And also that the teacher's role in the classroom is being constantly affected by technological changes. I taught undergraduates and postgraduates before modern technological aids in teaching were freely used. I used the spoken word, a piece of chalk, the blackboard, books and journals. Sometimes I gave cyclostyled to students from books not easily available to them. I did not access information on the Internet or send instructions to students on email. I did not ask for overhead projectors, leave alone power point. I suppose even today a large number of University/college teachers in India work as I did, without these modern aids.

The most important part for a teacher is the decision she or he has to take about the material content of lectures. Here I would like to briefly share some of the ways in which I handled the content of my introductory lectures: in the courses I taught in Logic and Philosophy. At the undergraduate level, especially in the humanities and social sciences, the first topic in the syllabus is the nature and scope of the subject itself. For example, What is Logic? What does it study? How can an interesting introduction to Logic be made? I found it useful to connect the introduction with the ordinary experience of our day-to-day lives. For instance, I said to the class:

How to introduce a course

you wake up in the morning and do a few things to be ready for college; as you wash and dress up, have breakfast, walk to the bus stop, catch your bus, etc. you are also thinking. All activities involve thinking, even though one is not always aware of the thought processes. In fact, one seldom stops to think about thinking itself. Because, man is essentially a doer. So was our ancestor, the primitive man. Early man had to be alert and do things to survive. He could not afford "to stand and stare". Dreaming and thinking were luxuries for later and better times. In the history of human civilization, man first started thinking about nature around him – about day and night, the seasons' change, the plants and animals he used or feared, and the tools he made to meet his requirements. The study of natural phenomena preceded the study of man himself, especially the study of his thinking. Having prepared the students, I would then pass on to Logic as the study of thinking. Logic is thinking about thinking in a systematic manner, I would tell them. It is the study of drawing conclusions from premises, from what is stated as the given. It also examines the assumptions we make when we reason. It studies how we observe events, regular succession of events and similarities, and how we make generalizations. In logic we are concerned with valid, correct conclusions, not just with describing how we think, but with the study of reasoned arguments, with principles of valid reasoning, with the study of thinking involved in the formulation of justifiable laws of science. A good lecturer has to give examples from ordinary life and from the studies and the sciences already familiar to the student.

The other course, I usually introduced was Ethics and Social Philosophy and would do so by talking about the need for rules in human society. I would say that man cannot live alone. He lives in groups and no social group can function without its members accepting consciously or otherwise some conventions, rules and regulations. If every man did what he liked or felt like doing, life would be chaotic for everyone. Life would be as Hobbes put it, "nasty, brutish and short". It is because we have developed customs and traditions, norms, rules and laws, that a family, a neighbourhood, a school, a market, a workplace, a nation-state and other groups and institutions carry on their functions and individuals are cared for, grow and fulfil their roles. "No man is an island," said the metaphysical poet John Donne. One is cared for and learns to care because of family and other groups in which we live and move and have our being.

After this introduction (what I have given here is very brief) the lecturer can distinguish between customary morality, and moral rules, as rules which have universal application and are the subject matter of ethics. One could discuss what is right for me as a human being as distinguished from what is right for me as a member of a particular caste, creed or race. The analysis of concepts such as good, right and duty could follow, and then the study of various ethical theories.

Thus, I have given very briefly some ideas about the introduction to the two courses that I taught to large classes. I observed that undergraduates in both the Arts stream and the Science and engineering one responded well to such introductions.

So, after the introduction (2–3 lectures) the second important part of handling course content is how to proceed after the subject has been introduced. It is time to take up the building blocks of the subject itself–the various topics in the syllabus. Start with the basic topics, explain basic concepts and give clear definitions. The lecture could begin with a quick recall of important questions dealt with in the previous lecture. Consolidate and build on what is already known. Good science teachers draw diagrams on the blackboard to help students understand complex phenomena and difficult concepts and theories. Tables too can be effectively used. In logic and mathematics and in sciences like physics and chemistry, problems can be solved applying principles, laws and formulae learnt earlier. This is also a time for interaction between the teacher and the students and among fellow students themselves, a time for getting to know one another, a time for stimulating competition as well as cooperation.

What to do after the course has been introduced

I recall the time when I gave the class a problem in symbolic Logic and one, which I thought was not easy. It was to construct a proof for a given conclusion by using the premises stated and applying various principles of deduction. I had hardly written the problem on the blackboard when one student had the entire proof ready. No one else in class matched this speed. He was very good in mathematics and later gave up engineering to become an award–winning

mathematician in the US. An exceptional student can provoke ill feeling and envy. But fortunately for me and for the rest of the class, very soon he learnt to keep a low profile and I not to ask him to solve the problems. I recall the various logic classes I have had over the years as full of fruitful and enjoyable interaction.

The third important part of handling the course content is how one plans and delivers a lecture and a course of lectures in philosophy. A lecture in philosophy involves combining the informative content pertinent to the course, say social and political philosophy, with learning how to analyze concepts, the meanings of words, how to use language and how to evaluate theories. The lecture or the course of lectures has to include: (i) the exposition of ideas of particular philosophers or of schools of philosophy on particular issues; (ii) a criticism and noting of their drawbacks; and (iii) a summing up of their contribution to the understanding of basic questions in philosophy or in a particular field of philosophy.

The lecture/lectures in a way involve *the dialectical method* – thesis, antithesis and synthesis. This approach was perhaps strange to students of science and engineering in my humanities classes. Accustomed as they were to science teaching in high school and college, they noted down everything I said as statements of fact, something not to be questioned. So when I gave the drawbacks and criticism of some philosophical position I had discussed, they were surprised. One of them remarked to a friend of mine that I explained a philosopher as though his was the final word, quoted from his writings and so on, but then went about systematically to demolish him. He added that finally and surprisingly I wound up the discussion by resurrecting him and emphasizing his contribution to our understanding of the problem. After a few weeks of tossing ideas back and forth, students learn to appreciate this method. Because philosophy is concerned essentially with asking questions and with raising relevant and searching questions. Socrates method of teaching consisted of asking questions to his students. He made them think of suitable answers by a careful examination of the questions themselves and so led them to the basic problem itself. The consideration of different points of view, the willingness to argue giving reasons and the humility to realize that we do not know, that we cannot give easy answers,

How to deliver a course

that we have to continue to seek knowledge–these are lessons a course in philosophy can give.

Though I am not a teacher in literature, I would also like to share some thoughts about teaching literature. My justification for putting down these thoughts is that I love literature and have had some memorable moments as a student in literature classes. Some of the unforgettable experiences for me as a student have been when the poem or play or parts of the novel have been read well by the teacher. I still recall with a thrill the words of the teacher who used to say, "Let us enjoy this poem together" and then read the poem. If the poem was long, she stopped after a few stanzas to talk about the poem. But never started the poem with the analysis and explanation. She gave us time to feel and think. Whereas I recall with horror how Mathew Arnold's "Dover Beach" was torn to bits with his commentary by the professor in the English Literature class (a selection of Arnold's poems was a compulsory paper for all B.A. students of my batch). Another experience I always remember is attending a B.A. Sanskrit class where Kalidasas' *Shakuntalam* was being taught. My friend who had always talked about the Sanskrit scholar professor had dragged me along. I had not studied Sanskrit, but as the professor read the text and explained, I was spell bound. The beautiful and graceful Shakuntala had come alive.

A sensitive teacher plays an important role in developing a taste for literature among the young. Perhaps a recorded recitation of a poem or, say, of Lawrence Olivier's' selections from Shakespeare could be used as teaching aids. Most of us who are not specialist students of literature have to be shown how literature is the gateway to life itself; that through literature we learn about our human condition, about man's place in nature and his aspirations for the everlasting. We need to learn to love literature.

A sensitive teacher plays an important role in developing a love for the subject among students

Before I conclude, I must say that teacher-assessment and course-assessment by students are useful for the teacher. Apart from the formal assessment programme, I got feedback directly from students, especially in elective courses where the classes were small. The feedback was frank and not always flattering. I

remember a student telling me that I needed to draw more from modern physics and chemistry for my course, Philosophy of Science. I relied more on the physics and chemistry I was familiar with and on the biological and the social sciences. For the first two years I taught Philosophy of Science, I had very good students in my class. I learnt a lot from the discussions I had with them and from the books we lent one another. As engineering and science students at IIT, they knew more science than I did. In other courses too, as I have said earlier, I was a learner participant as well as teacher. My years in academia were largely devoted to teaching and learning. I remained a student all my life.

Teacher-assessments and student course-assessments are useful for the teacher

A few words about my choice of teaching as a profession. I started the essay with my childhood play-acting as a teacher, and it could have remained only a child's game, as I was not brought up to think of a career. I expected to get married and be a good housewife. There was no role model of a working woman in the family. I would have fully accepted the words of the Bible 1 Corinthian Chapter 13. 11: "When I was a child, I spoke as a child, I understood as a child, I thought as a child: but when I became a man, I put away childish things." I had toyed with the idea of creative writing as perhaps something compatible with what was being planned for me. But college education, books and ideas, meeting people especially a particular professor who influenced me a lot, made me think of teaching at a college after my postgraduate studies. Teaching was not a career I had planned for or looked forward too. But as it happens in many arranged marriages where the partners learn to love each other, I began to enjoy teaching and love being a teacher. I am sharing these concluding thoughts particularly with those, who did not plan to be teachers. Because when there is an urge to communicate and a want to be with the young, even the one who strayed into this profession can find fulfillment. It is this love to communicate, to be with the young, to hold their attention, to provoke them to think – that has helped me to have happy times as a teacher.

How to succeed though you did not plan to be a teacher

Nalini Swamidasan taught at Sophia College, Mumbai and at Mumbai University for nine years. From 1962 to 1990, she taught Philosophy at IIT Bombay at the Department of Humanities and Social Sciences and was for a time its Head. She can be contacted at yarohol@vsnl.com

IDEA INNOVATORS

20

It Really is all About Your Enthusiasm

Poorvi Vora
Computer Science

My teaching experience comes from two years in my current job teaching Computer Science at George Washington University, one year of teaching Biomedical Engineering at IIT-Bombay, and about one and a half years teaching calculus as a post-graduate student at Cornell University. In this essay I will attempt to describe the important lessons I have learnt about teaching, and how I apply them to the daily problems of a professor in a university.

I have always loved teaching, and have been very lucky in being assigned subjects that I have a deep interest in. It would have been far more difficult to teach subjects I did not like, because genuine enthusiasm for the subject is an exceptionally effective tool. Without it, a lecture is a sequence of mundane facts that a student is expected to regurgitate at exam time. With it, a lecture is a window into a wondrous world of interesting ideas with exciting, hitherto completely unexpected, connections among themselves.

Genuine enthusiasm for the subject is an exceptionally effective tool for good teaching

Notice that I do not say a *student's* enthusiasm for the subject is necessary for a good and successful lecture. A student's interest is a great thing to have, and interested students are few and treasured! But, in a typical class, most students are indifferent, a few are outright hostile, and even fewer are genuinely interested. Without interest in the course, students are less likely to learn the material well. If the teacher is genuinely fond of her subject, this is not an insurmountable problem as she can communicate her enthusiasm to her students. In fact, this, I think, is what teaching is all about—communicating the exciting aspects of the subject being taught. In my case, mathematical structure has been a very useful driving force in my research, resulting in work that is both applicable and generalizable. I have found that I am able to communicate both the attraction of structure, and its usefulness, to students of all kinds—junior college, graduate, engineering, mathematics, medicine, biology, hotel management—and motivate them strongly too. Energy invested in motivating students is typically exceptionally well spent; the grades of a number of my underperforming students turn around once they find the work interesting.

In a typical class, most students are indifferent, a few are outright hostile, and very few are genuinely interested

The main course I teach, cryptography, is very mathematical, and students can find it difficult, puzzling, and intimidating. I use my enthusiasm as a tool to encourage them to engage with me, and hence, through me, with the subject. For example, in a first lecture, I talk about what I hope the students will learn from the course, why it is useful to them, and what I like about it. In particular, I talk about the mathematical topics that are typically difficult for the students (algebraic number theory, cryptanalysis, complexity-theoretic problem formulations). I try to imply that these difficult topics are magical, and that the structure they expose holds the key to the beauty and importance of the subject. Usually, at first, the students think I am a bit of a lunatic! But they begin to get drawn in because they want to figure out how anyone could possibly like this strange and difficult material. This provides the perfect segue into teaching the technical aspects to draw them in further.

There is another reason I start my course in this manner. I feel that independent thinking and an understanding of the fundamentals are the most important lessons a student can leave college with. Hence it is important to start a course emphasizing that the fundamental material is an important part of the course, and that it provides the basis for the students' own ongoing independent evaluations of advances in the subject in the future.

Independent thinking and an understanding of the fundamentals are the most important lessons for a student

Students and others are surprised that I choose to spend so much time and energy on fundamentals. They think that, because I have worked in the industry for about eight years, I would emphasize applications. I respond that it is because I worked in industry and saw the remarkable changes the American information technology industry has gone through—first hand—that I emphasize the fundamentals. The world of information technology is moving at an exceptional pace. The only way to keep up with it is to have a solid foundation—so that one can think independently, and view the changes as variations of what one already knows. A manager in a company prefers employees who are equipped to respond well to change, because she does not know what she will be assigned to tomorrow. An employee is more flexible when her fundamentals are strong, because she feels grounded enough, technically, to take up new ideas and new extensions of old ones. For example, if an employee knows only programming, in the language *du jour*, she will not be able to adjust to a new language, or a new computing paradigm. Unfortunately, we cannot predict the changes that are around the corner. We can, however, prepare our students well, so that they are not intimidated by change, and have the tools to respond well to it.

Learning fundamental material is more difficult for the student who is not confident. All through the semester, I expend considerable effort getting students to understand that the material is easier than it appears, and that they *can* learn it with some effort. I also try to stay very active in my research, because then I know what it feels like to struggle with difficult material. I think paying attention to their *confidence level* is important. Very difficult material can bring a student down and significantly hamper learning.

Keeping these goals in mind—mastering the fundamentals, learning independent thinking, and building confidence—I apply specific techniques I have learnt over the years, starting with the first lecture. I usually start by distributing handouts on what the goals of the course are, what topics I expect to cover and on what dates, and how I will be grading. *I also make sure that I teach something substantial in the first lecture.*

A teacher's very first class of the course should set out her expectations

I have found that it is better to do so than to provide only an overview. I have also found that it is better to make the first lecture slightly difficult than to make it slightly easy. The former communicates to the students that I really know my material, and that they can have difficulties with the course if they do not invest time and energy. It also helps me start on the right foot with respect to establishing discipline in the class. If the material is too easy, the students do not pay as much attention, they do not see the extent of the teacher's knowledge of the field, and also do not realize that there is a lot to learn. I am often tempted to water down the material when I see students having difficulties, but this is unfair to them. In order to achieve the goals I have set for myself and my students, they will often have to encounter difficult material, and, at such times, I should not let my desire for popularity overcome my responsibility as a teacher. The question about what material is too difficult, what is easy, and what "just right" is a wholly different one, however!

When I was being interviewed for a faculty position, one of the professors interviewing me asked me a question that still has me thinking. He asked if I target the strong students or the under-prepared ones. I gave a non-committal answer then, saying I *targeted the average student*, but this is a question worth pondering. It is necessary to engage the attention of the strongest student in the class—this is the student most likely to contribute to the field and to use the material well wherever she goes after she graduates. On the other hand, if one ignores the under-prepared students, one is being unfair to them and

Engage the attention of the strongest student in the class – this is the student most likely to contribute to the field

missing the opportunity to prepare well society's creative resources. I try to address this dilemma by teaching material at the level of the average students, introducing some advanced topics at the end of each lecture, and providing reading material for those interested in them. I also have office hours when students can come and ask me questions, and do my best to be accessible outside class. This way, the specialized needs of the brightest and most under-prepared students are not addressed in class, but outside it.

Classroom discipline is particularly important for me because I encourage students to ask questions in class. Questions enable me to determine if the lecture is too easy or too difficult, and also help me identify specific topics that the students are having difficulty with. Yet, with more student participation, the classroom can degenerate into a rowdy ruckus, with students constantly testing the teacher. (I had one student in my first semester at George Washington, who constantly challenged me in class.) I have found that classroom discipline is easiest maintained when the teacher demonstrates that she knows a lot of material that the student does not. I experience the fewest challenges to my authority when I ensure that the students are constantly stretched, and when I do not let even the most difficult questions intimidate me. Because the material is not straightforward and easy, they respect me for being able to deal with it. I think students in college are too old for any other approach to be effective.

Classroom discipline is particularly important when a teacher encourages students to ask questions

I try to *prepare well* for a lecture (the best lecture I have taught has been, perhaps, my least-prepared one, but I prefer not to rely on luck every time!). I make slides using Microsoft PowerPoint, these slides hold all the points I plan to make in the lecture, in order. I make the slides available beforehand on my course website; students often print them out and bring them to class. The slides do not target the student, they are written as notes for my own reading. So, while the students should use the textbook for details, the slides can provide them with guidance regarding what was taught in class. The slides are, however, a double-edged sword. On the one hand, because the students have the slides with them, they are not frantically taking notes. Instead, they pay attention, sometimes

glancing at their version to ensure it is what I am showing. On the other hand, I am often not prepared well ahead of time, and sometimes change the slides right before I teach, so they start scrambling around wondering why they have a different version! I also often use the blackboard for proofs and example problems—such material is very difficult to present well on slides, and students sometimes expect that everything will be available on the slides.

I spend a lot of time developing *examples* for the class. Well-chosen examples are exceptionally helpful during technical treatment. These are difficult to find, but the perfect ones have two properties. First, they are simple to grasp, even for the non-technical person. Second, on further examination by the technical person, they reveal all the mathematical properties of the problem at hand. Consider one a friend provided me; I use it in both the computer security course and the cryptography course. This example illustrates the process of randomization—where "noise" is added to health statistics the revelation of which might otherwise violate privacy. The "noise" is carefully chosen so as to reveal the types of patterns that statisticians seek, while, at the same time, protecting individual privacy. The example is as follows.

Simple examples are exceptionally helpful in explaining technical ideas

A public health survey calls up individuals asking if they are HIV positive. Because individuals would not be too willing to provide this information, and because it would be a flagrant violation of their privacy to expect them to provide the answer truthfully, they are allowed to lie. The individual is asked to throw a (regular, six-sided) dice—such as those used for board games—and to lie if the dice shows 3 or 6, and respond truthfully otherwise. The caller does not know what the dice showed. This means that about two-thirds of the responses obtained by the caller are correct, and about one-third incorrect—the caller does not know which are which. To the non-technical observer, the fact that the respondent does not always have to answer truthfully is attractive, and clearly provides some kind of privacy protection. On some technical examination, because more than half of the responses are true, the community HIV statistics can be determined from many responses, if the respondents follow instructions. On some more technical examination, the respondent is seen as encrypting his single bit of the correct answer with the single bit provided by the randomness of the dice throw. The encryption is perfectly secret if the respondent lies for half the throws and not for the other half. I have been able to find only a handful of such (great) examples, and continue to look for more.

On the *course website*, I make available links to reading material for the course, organized along with the lectures the material is relevant to. There is no single good textbook for some of the courses I teach. For these courses, I prescribe a single textbook which I use for a specific subset of the topics covered in the course. For the other topics, I make available additional material—such as papers or websites or photocopies of material from another book—for the students to study from. I have found that it is very important for the students to know the source for my presentation. Also, it is easiest on the students if I use a single source to inspire the progression of thought involved in explaining a single topic. They deal well with referring to multiple sources to learn the material and for examples, but it confuses them if they cannot find my train of classroom thought intact in one of the sources.

Prescribe a single textbook but provide lots of reading material to students

I provide a number of homework assignments that count towards the grade. The assignments are a mix of theory and implementation. The theory tests the mathematical understanding of the abstract ideas—perhaps a proof that I deliberately left out of a lecture, or a complexity analysis. The implementation part has them write a program for a specific important technique that was taught in class. I find that homework assignments solidify what the students have been taught in class, and that a large fraction of the computer science students need to implement a technique to really understand it. More importantly, I try to design my assignments to encourage independent thinking; there is not much to be gained from an assignment that simply repeats what was taught in class.

Homework helps to solidify what students have been taught in class

I used to assign *group projects* instead of a final exam, but have decided not to continue the practice – except in the advanced post-graduate courses – for a couple of reasons. First, project presentations take up about two weeks of the fourteen week semester. The students do not learn as much from the presentations of their classmates as they would from two weeks of my teaching. Second, projects are quite difficult to grade, especially because they are done in groups, and because each topic is different. On the other hand, students do learn a lot from working on their own projects. Projects are also the best way to encourage independent thinking, so it has been a difficult decision. I will, however, be making the homework assignments more like mini-projects, so that students are encouraged to learn and think independently. Next year, I will be using projects from this year's students to illustrate some of the cryptographic algorithms while teaching them.

Projects are the best way of encouraging independent thinking in students

I teach a course in advanced cryptography that, in addition to going deeper into cryptography, is also meant to *introduce students to research*. The course is taught as a mix of a seminar course and a regular one. For the first month or so, I teach basic topics in cryptography not taught in the introductory course (theory of secrecy, zero-knowledge protocols and elliptic curve cryptography). Thereafter, students read, present and discuss papers on electronic cash, anonymity, electronic voting and cryptanalysis. Towards the end of the semester, each student picks a topic of his or her liking, writes a survey paper on it and presents it to the class. A couple of the students present original work – however, I do not expect this of the entire class. All of them are not doctoral students in cryptography, hence it is sufficient if they are able to present an intelligent review of the existing work in the topic of their choice.

I am currently designing a class to teach cryptography to non-math, non-engineering undergraduates, who have some mathematical knowledge (equivalent to, say, the Maharashtra HSC Level) and interest. The first half of the semester would address the mathematical concepts in seven weeks—covering classical ciphers, perfect secrecy, symmetric key encryption as composed of the basic modules of classical ciphers, and simple public key encryption. In the first half of each week, the lecture(s) would look at a key example such as the randomization one I described above, and the students would play with the various parameters of the example. The mathematical ideas would be formally stated in the second half of the week, but would not be proved as in a regular cryptography course with a more technically prepared audience. In the second half of the semester, i.e. the remaining seven weeks, the students would examine the applications of cryptography to their daily lives, such as electronic payments with credit cards, smart cards, electronic voting, digital rights management and music and video piracy, etc. This part of the class would not be mathematical, but would critically examine the use of these technologies based on what was studied in the first half of the class. The grading will be based on the performance in a mid-semester exam on the mathematical properties, and a final term paper on a single application of cryptography, its dangers and benefits.

An example of how to teach a subject to non-mainstream students

I have been rewarded with some very positive responses from students. They are uniformly typically mathematically more confident, and able, when they leave my class. They also have a more sophisticated understanding of their roles in technology, and are more aware that they are not learning a specific technique, but that they have learnt a way of thinking. Most rewarding, however, is their renewed enthusiasm for the material. My most memorable lecture is one in which my students responded to each and every example as I had hoped they would. When it was finally time to end the lecture, I said I would continue in the next class. This was a beautiful Friday afternoon, when American students often want to run off way before the lecture ends. But these students actually said "You can't do that to us, please finish it". Not one of the students left while I spent ten more minutes completing the mathematical formalization of the examples I had explained earlier!

I really enjoy teaching and, so far, the field has been very good to me. For this success, I would like to thank my parents and my brother most of all. I learnt—from them, while growing up—enthusiasm, confidence and belief in the abilities of each individual. These have been essential in my teaching.

Poorvi Vora has been teaching Computer Science at George Washington University, USA, for the last two years. Before that, she was at Hewlett-Packard, USA, for about eight years. Her Ph.D is from North Carolina State University, USA. The author can be contacted at poorvi@gwu.edu

PHOTOS

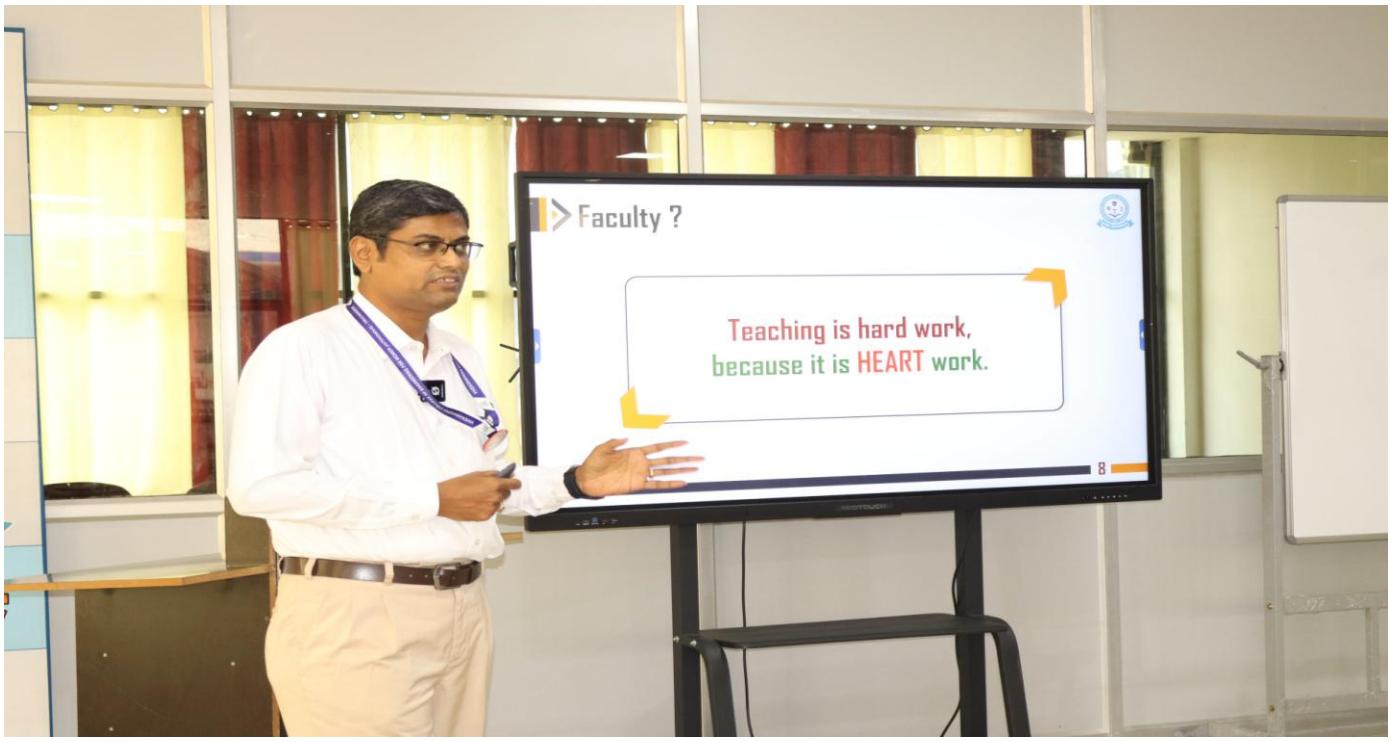
Glimpse of Photo

"Communication Skills, Modes and Knowledge Dissemination"

by

Prof.Dr.S.Kuppuswami, Executive Director/VEI

Glimpse of Photo



“The Art of Being a Brilliant Teacher”

by

Dr.KCK.Vijayakumar, Principal/VCEW

Glimpse of Photo

“Human Values”

by

Dr.S.R.Kannan, HoD/S&H, VCEW

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"Technology Enabled Learning and Life-long Self-learning"

by

Dr.C.Poongodi, HoD/CSE, VCEW

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“Moodle & LMS Platform”

by

Dr.M.Sayeekumar, HoD/CST, VCEW

Glimpse of Photo

“Instructional Planning and Delivery (OBE)”

by

Dr.C.Uthayakumar, Director, IQAC/VCEW

Glimpse of Photo

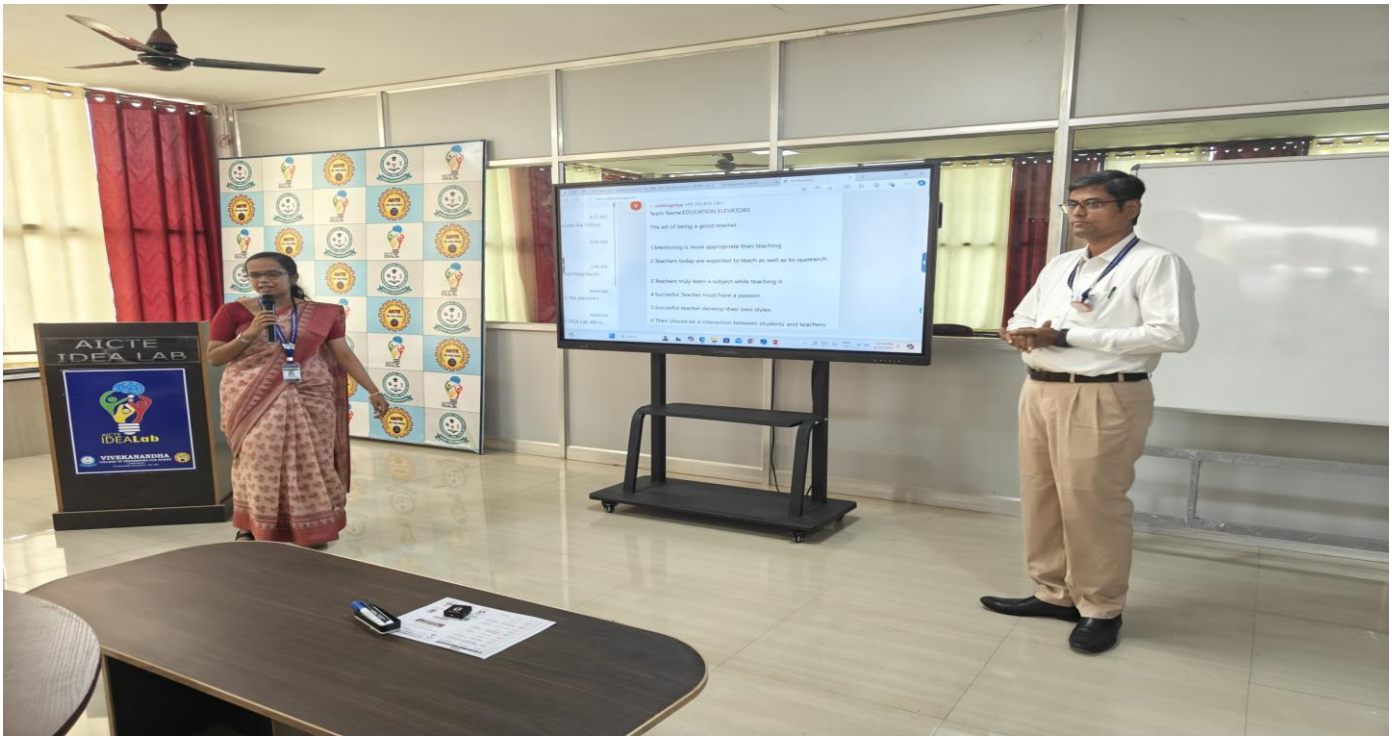
"Activity Session"

Title of the Book	**Secrets of Good Teaching**
Chapter No.	**8**
Chapter Name	**Teacher Lessons**
Name of the Team	**Brilliance Builders**

Key Points discussed by Team Member	
S.No.	**Key Points**
1	A teacher has to be prepared for any eventuality and to make do with the minimum of facilities, without complaining
2	Try to interact with the students as they are, not as you wish they should be
3	Always encourage who is enthusiastic and help one who has problems
4	Admit your mistakes without 'loss of face' and correct it
5	Teaching and mentoring is a key role of a teacher

Glimpse of Photo

"Activity Session"



Title of the Book	**Secrets of Good Teaching**
Chapter No.	**9**
Chapter Name	**A Commitment to Excellence**
Name of the Team	**Education Elevators**

Key Points discussed by Team Member	
S.No.	**Key Points**
1	Mentoring is more appropriate than teaching
2	Teachers today are expected to teach as well as to research
3	Teachers truly learn a subject while teaching it
4	Successful Teacher must have a passion
5	Successful teacher develop their own styles
6	There should be a interaction between students and teachers

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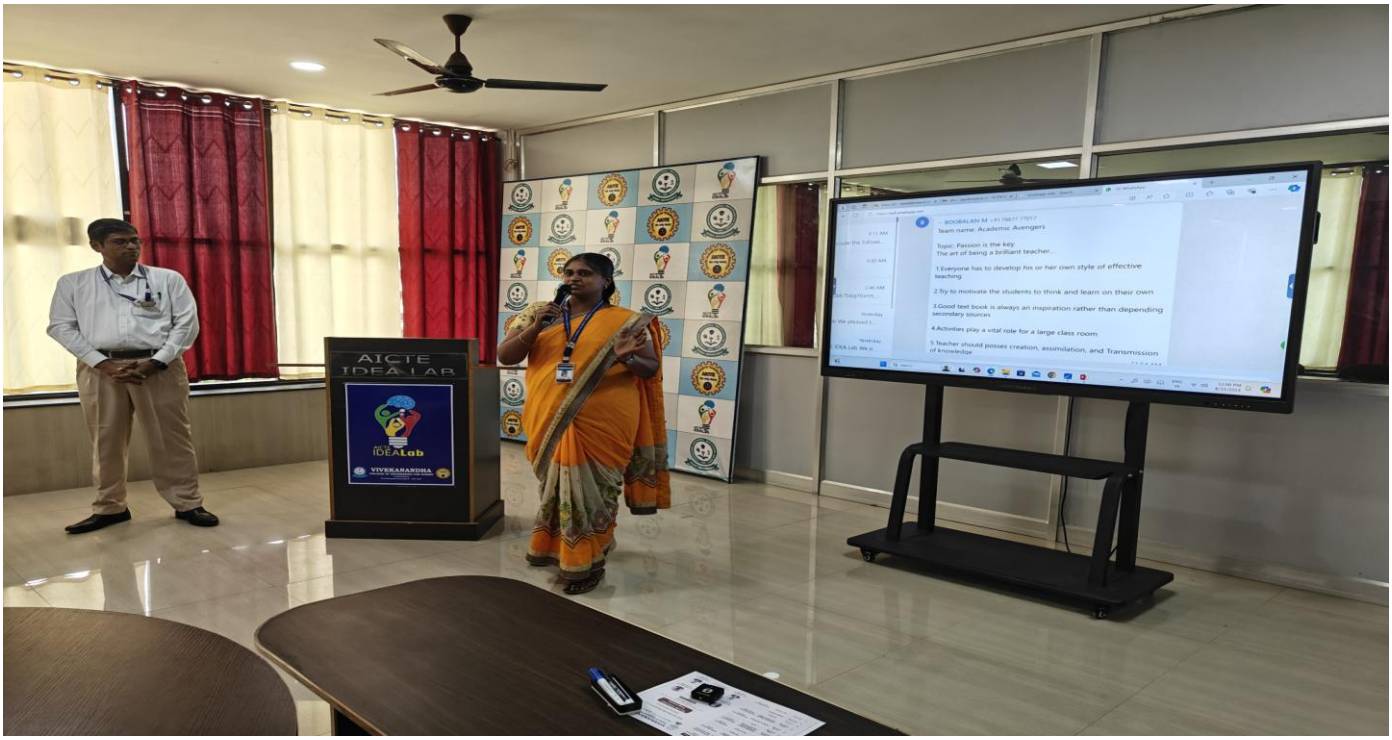
"Activity Session"



Title of the Book	**Secrets of Good Teaching**
Chapter No.	**10**
Chapter Name	**Passion is the Key**
Name of the Team	**Academic Avengers**

Key Points discussed by Team Member	
S.No.	**Key Points**
1	Everyone has to develop his or her own style of effective teaching
2	Try to motivate the students to think and learn on their own
3	Good text book is always an inspiration rather than depending secondary sources
4	Activities play a vital role for a large class room
5	Teacher should posses creation, assimilation, and Transmission of knowledge

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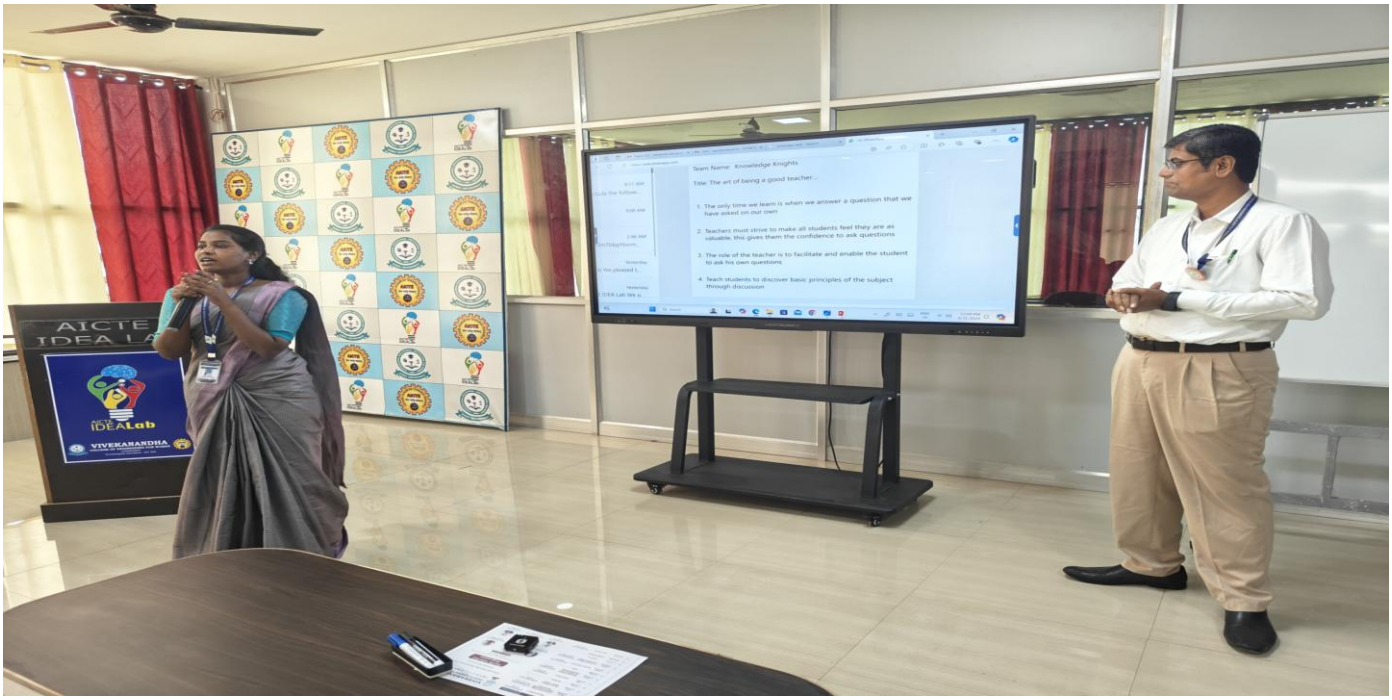
"Activity Session"



Title of the Book	**Secrets of Good Teaching**
Chapter No.	**11**
Chapter Name	**Teaching and the Pursuit of Clarity**
Name of the Team	**Knowledge Knights**

Key Points discussed by Team Member	
S.No.	**Key Points**
1	The only time we learn is when we answer a question that we have asked on our own
2	Teachers must strive to make all students feel they are as valuable, this gives them the confidence to ask questions
3	The role of the teacher is to facilitate and enable the student to ask his own questions
4	Teach students to discover basic principles of the subject through discussion
5	Learning is not about teaching methods but about the ability to Kindle thinking and the desire for knowledge in students mind

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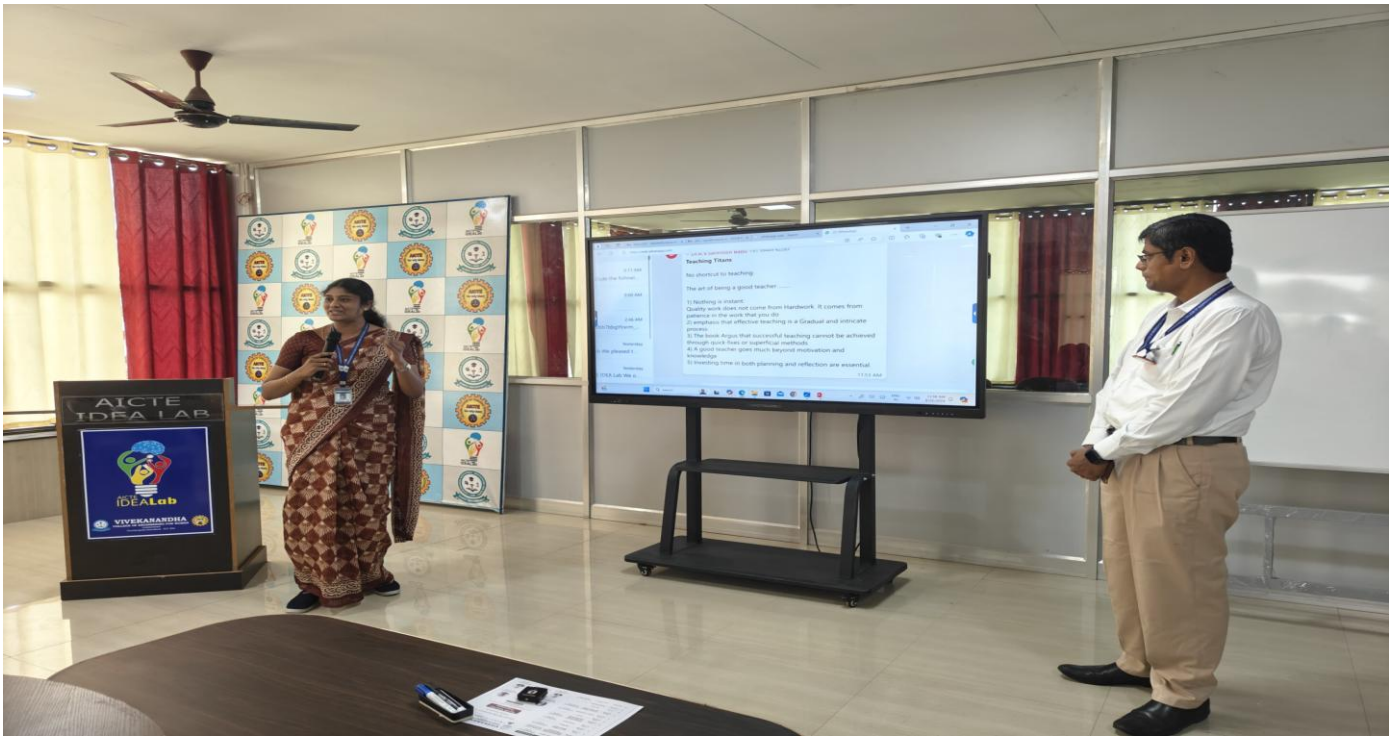
"Activity Session"

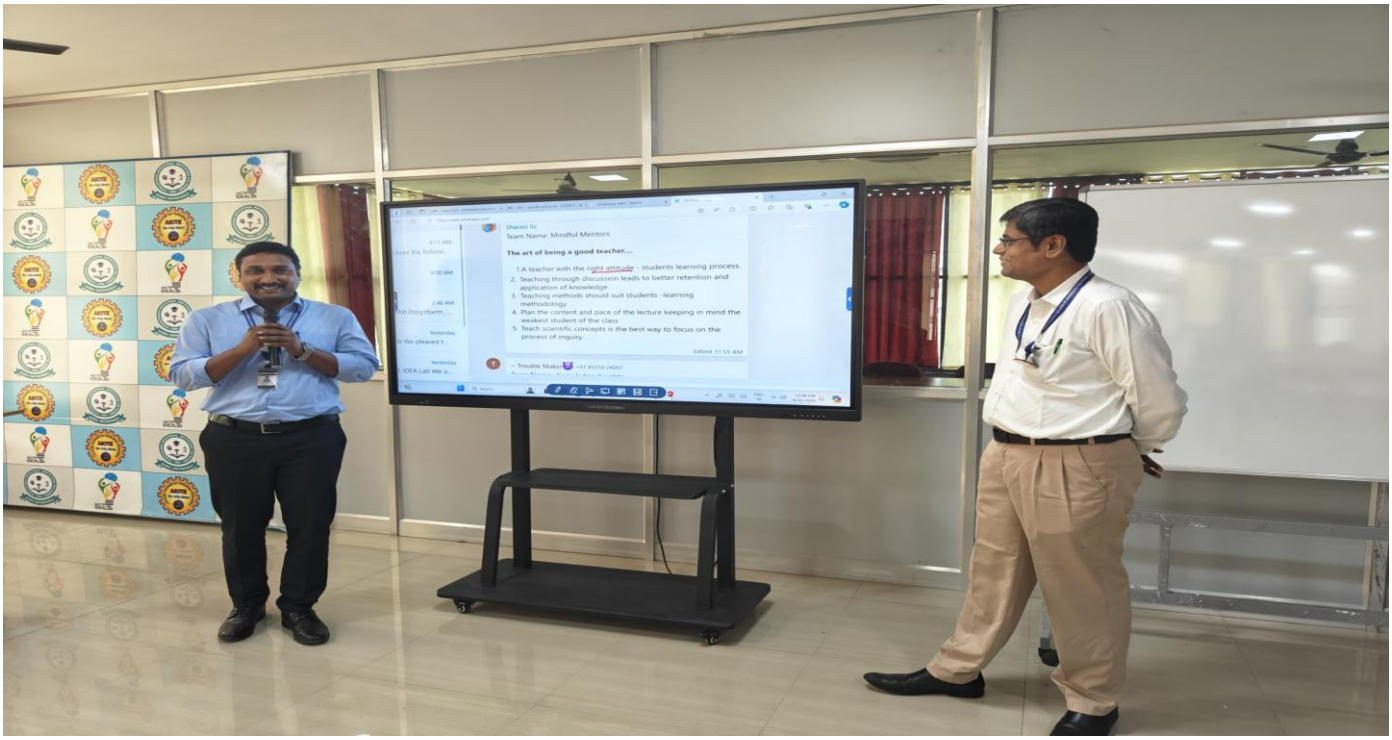


Title of the Book	**Secrets of Good Teaching**
Chapter No.	**13**
Chapter Name	**No Short Cuts to Teaching**
Name of the Team	**Teaching Titans**

Key Points discussed by Team Member	
S.No.	**Key Points**
1	Nothing is instant: Quality work does not come from Hardwork. It comes from patience in the work that you do
2	Emphasis that effective teaching is a Gradual and intricate process
3	The book Argus that successful teaching cannot be achieved through quick fixes or superficial methods
4	A good teacher goes much beyond motivation and knowledge
5	Investing time in both planning and reflection are essential

Glimpse of Photo

"Activity Session"



Title of the Book	**Secrets of Good Teaching**
Chapter No.	**15**
Chapter Name	**Good Teaching as an Attitude**
Name of the Team	**Mindful Mentors**

Key Points discussed by Team Member	
S.No.	**Key Points**
1	A teacher with the right attitude - students learning process
2	Teaching through discussion leads to better retention and application of knowledge
3	Teaching methods should suit students -learning methodology
4	Plan the content and pace of the lecture keeping in mind the weakest student of the class
5	5. Teach scientific concepts is the best way to focus on the process of inquiry

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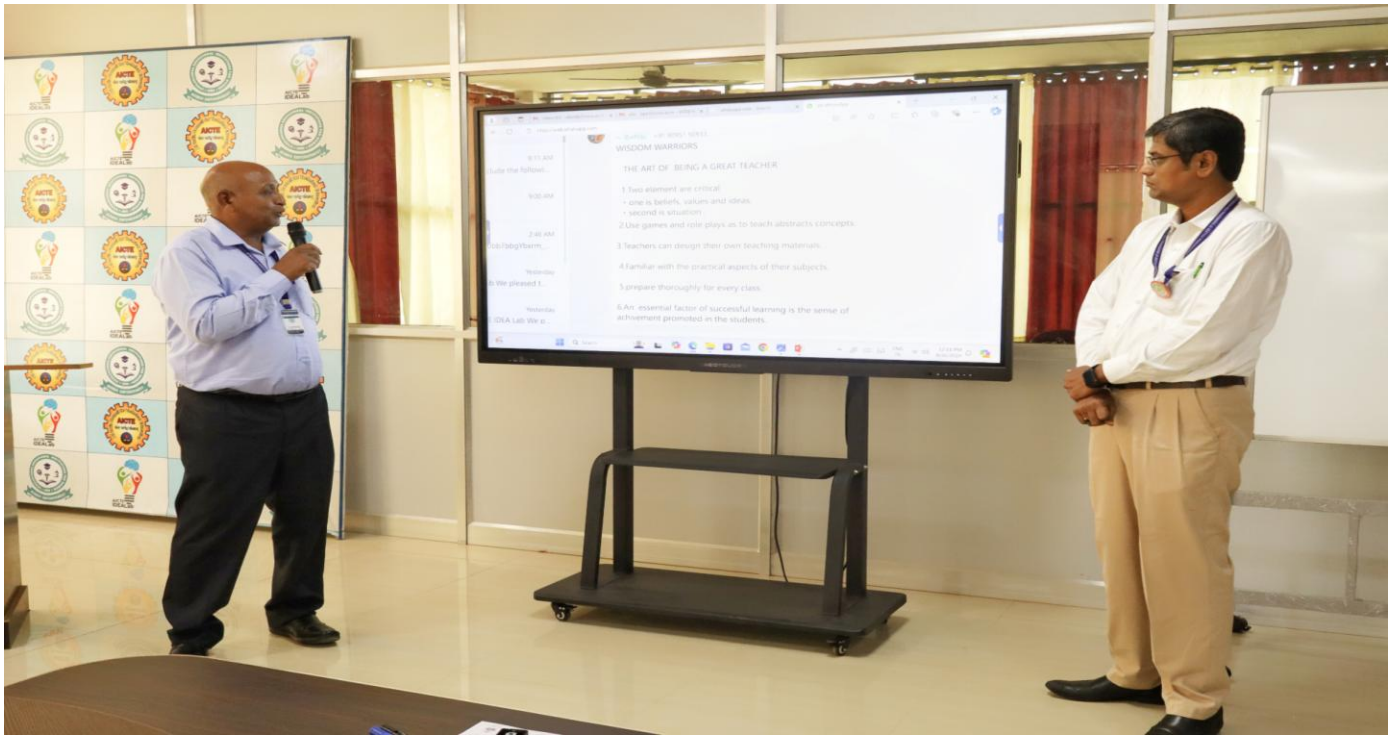
"Activity Session"

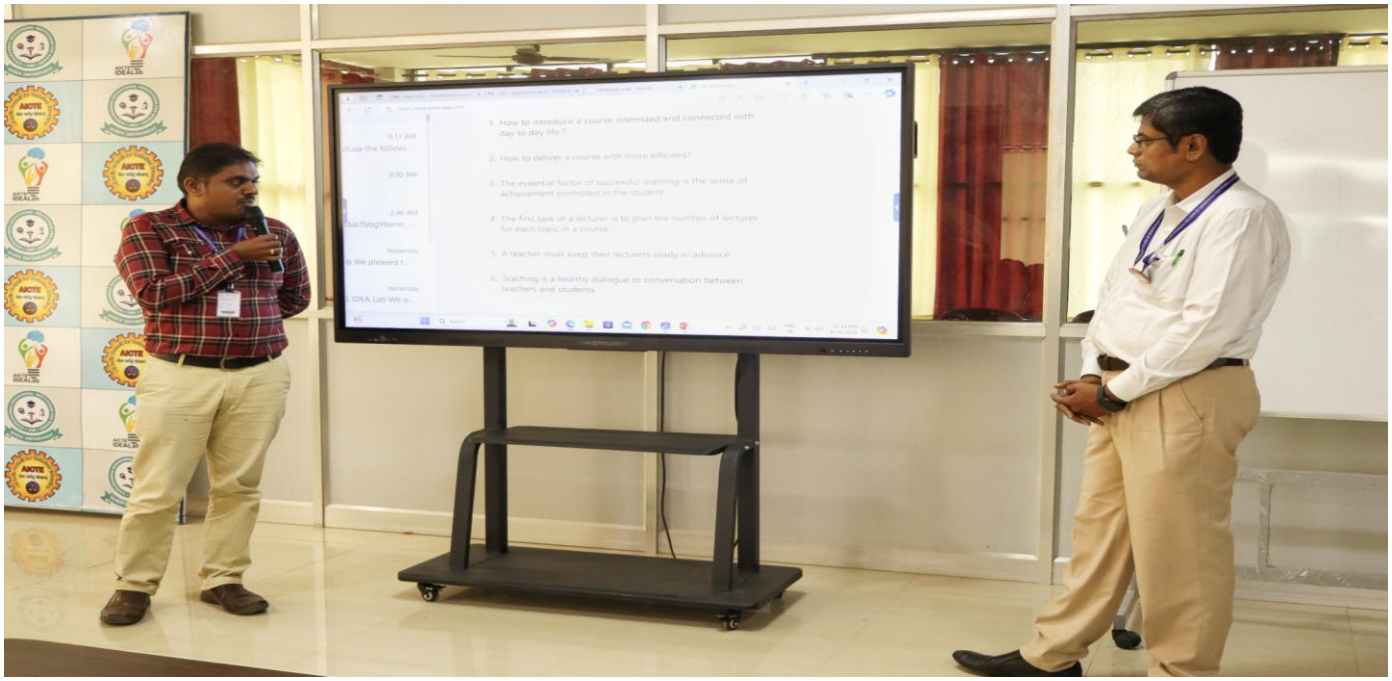


Title of the Book	**Secrets of Good Teaching**
Chapter No.	**17**
Chapter Name	**Teaching is an Art**
Name of the Team	**Wisdom Warriors**

Key Points discussed by Team Member	
S.No.	**Key Points**
1	Two element are critical, one is beliefs, values and ideas and second is situation
2	Use games and role plays as to teach abstracts concepts
3	Teachers can design their own teaching materials
4	Familiar with the practical aspects of their subjects
5	Prepare thoroughly for every class
6	An essential factor of successful learning is the sense of achievement promoted in the students

Glimpse of Photo

"Activity Session"

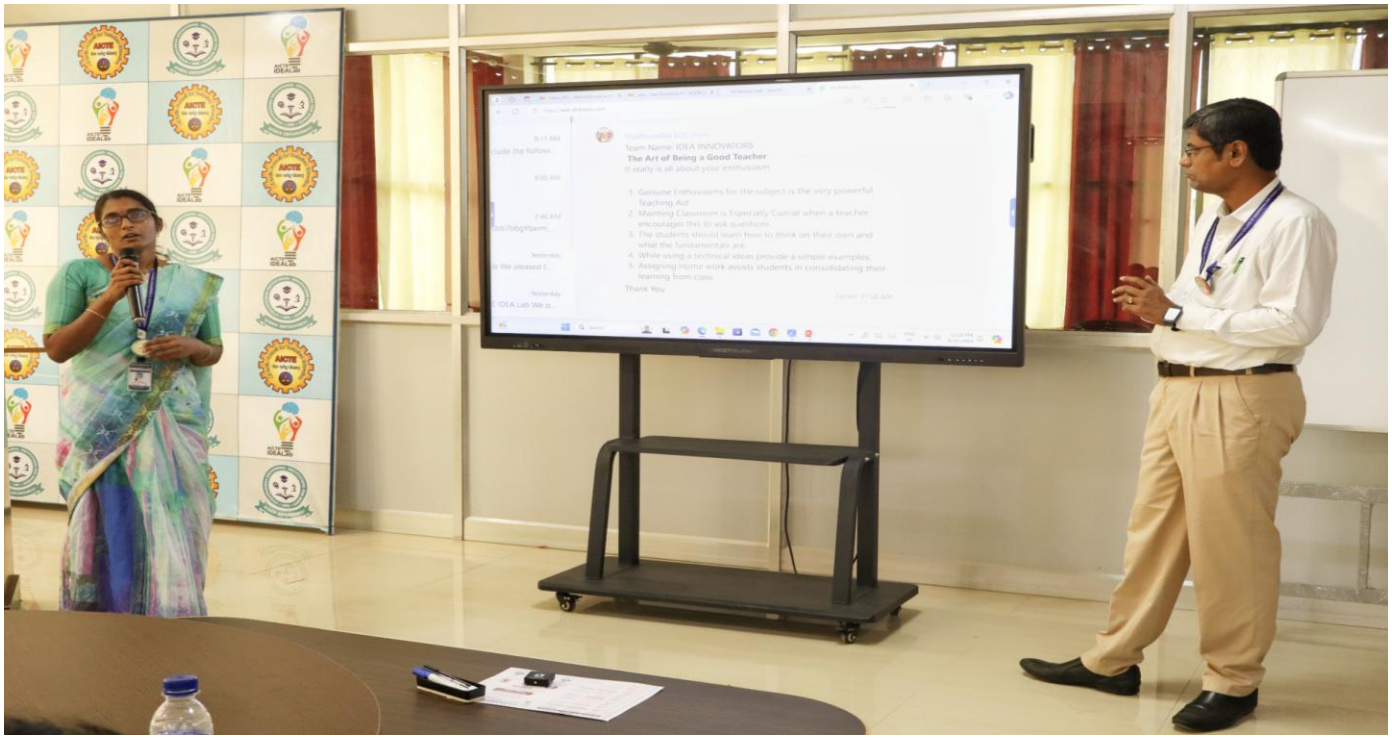


Title of the Book	**Secrets of Good Teaching**
Chapter No.	**18**
Chapter Name	**Sharing Happy Hours**
Name of the Team	**Master Minds**

Key Points discussed by Team Member	
S.No.	**Key Points**
1	How to introduce a course interested and connected with day to day life?
2	How to deliver a course with more efficient?
3	The essential factor of successful learning is the sense of achievement promoted in the student
4	The first task of a lecturer is to plan the number of lectures for each topic in a course
5	A teacher must keep their lecturers ready in advance
6	Teaching is a healthy dialogue or conversation between teachers and students

Glimpse of Photo

"Activity Session"



Title of the Book	**Secrets of Good Teaching**
Chapter No.	**20**
Chapter Name	**It Really is all About Your Enthusiasm**
Name of the Team	**Idea Innovators**

Key Points discussed by Team Member	
S.No.	**Key Points**
1	Genuine Enthusiasms for the subject is the very powerful Teaching Aid
2	Maintaining Classroom is especially crucial when a teacher encourages this to ask questions
3	The students should learn how to think on their own and what the fundamentals are
4	While using a technical ideas provide a simple examples
5	Assigning Home work assists students in consolidating their learning from class

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“Certificate Distribution”

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“Certificate Distribution”

ATTENDANCE

VIVEKANANDHA COLLEGE OF ENGINEERING FOR WOMEN
(Autonomous)

FACULTY INDUCTION PROGRAMME ATTENDANCE

S.No.	Name of the Faculty	Designation / Department	31.08.2024	
			FN	AN
Team : Master Minds				
1	Mrs.S.UMA	AP/CSE		
2	Mrs.S.BRINDHA	AP/IT		
3	Mr.R.SENTHILKUMAR	AP/CST		
4	Dr.K.LATHA	AP/CHEMISTRY		
5	Ms.P.PUSHPAVALLI	AP/TAMIL		
Team : Idea Innovators				
1	Ms.K.G.CHITHRA	AP/CSE		
2	Ms.G.MADHUMITHA	AP/EEE		
3	Dr.J.SARANYA	AP/MATHS		
4	Mr.R.KUMAR	AP/MATHS	AB	AB
5	Ms.M.JAYABHARATHI	AP/ENGLISH		
Team : Teaching Titans				
1	Ms.S.INDHUMATHI	AP/CSE		
2	Dr.A.V.SANTHOSH BABU	PROF./IT		
3	Mrs.S.KEERTHINI	AP/BME		
4	Mr.V.PATCHAMUTHU	AP/MATHS		
5	Mr.S.JOHNSON KARUNAKARAN	AP/ENGLISH		
Team : Wisdom Warriors				
1	Mrs.A.SARANYADEVI	AP/CSE		
2	Mrs.J.SARANYA	AP/ECE		AB
3	Dr.N.SUBRAMANIAN	ASP/BT		
4	Mrs.P.SAKTHI	AP/MATHS		
5	Mrs.T.GIRIJA	AP/PHYSICS		
Team : Education Elevators				
1	Mrs.S.KEERTHANA	AP/CSE		
2	Ms.L.VISHNUPRIYA	AP/CST		
3	Ms.S.ANJUSHREE	AP/BME		
4	Mr.BOOPATHIRAJA	AP/MATHS		
5	Mr.K.C.RAMESH BABU	AP/PHYSICS		AB

S.No.	Name of the Faculty	Designation / Department	31.08.2024	
			FN	AN
Team : Academic Avengers				
1	Mr.M.BOOBALAN	AP/CSE		
2	Mrs.D.VIMALA	AP/ECE		
3	Mr.D.JUSTIN JOSE	AP/IT		
4	Dr.C.CHRISTY GOLD BENCY	AP/MATHS		
5	Mrs.R.KUSHPOO	AP/ENGLISH		
Team : Knowledge Knights				
1	Mrs.J.KAVIPIRIYA	AP/CSE		
2	Mrs.A.SUMATHI	AP/IT		
3	Ms.J.JOHN MERINA	AP/CST		
4	Mr.S.KARTHIKEYAN	AP/CHEMISTRY		AB
5	Dr.E.VEERAMANIPRIYA	AP/PHYSICS		
Team : Brilliance Builders				
1	Mr.S.J.DEEBAK	AP/CSE		
2	Mrs.G.GOMATHI	AP/IT		
3	Mrs.S.GOWSIKA	AP/CST		
4	Mr.S.RAJMOHAN	AP/CHEMISTRY	AB	AB
5	Dr.V.RATHI	AP/PHYSICS		
Team : Mindful Mentors				
1	Ms.S.SHARMILA	AP/ECE		
2	Mrs.B.MADHUBALA	AP/IT		
3	Dr.N.DHAYANANTH	ASP/BT		
4	Ms.V.KAVITHA	AP/CST		
5	Ms.A.KANAGAVALLI	AP/PHYSICS		

FEEDBACK

VIVEKANANDHA

VCEW/QM/IQAC/FIP/013 A

College of Engineering for Women (Autonomous)

INTERNAL QUALITY ASSURANCE CELL

FACULTY INDUCTION PROGRAM ON 31.08.2024

FEEDBACK

Faculty Name: S. Uma
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College: VCEW

S.No.	Performance Criteria	Rating				
		Excellent	Good	Average	Fair	Poor
1	Presentation	✓				
2	Arrangements	✓				
3	Content delivered by Experts	✓				
4	Overall performance of program	✓				

Experts	Key Takeaway
Prof.Dr.S.Kuppuswami, Executive Director, VEI	1. 5P's (participate, plan, prepare, practice, perform) 2. Time Management 3. How the great inspiring teacher
Dr.KCK.Vijayakumar, Principal, VCEW	1. The art of being good teacher 2. Some activities Conducted related teachingclass 3. Learing by Seeing, listening, doing, Saying with real time example
Dr.S.R.Kannan, HoD/S&H, VCEW	1. Universal human values 2. Continuous happiness, prosperity 3. Give explanation about natural acceptance
Dr.C.Poongodi, HoD/CSE, VCEW	1. Technology based learning 2. Lifelong learning 3. Activity based learning in general & Academic with real time examples
Dr.M.Sayeekumar, HoD/CST, VCEW	1. Describe about Moodle 2. Features of Moodle 3. Difference between moodle and ACA
Dr.C.Uthayakumar, Director/IQAC, VCEW	1. Outcome based education Vs traditional education 2. Continuous quality improvement 3. Cause-effect relationship in education

Any other Comments: —

31/8/24
Signature

VIVEKANANDHA

VCEW/QM/IQAC/FIP/013 A

College of Engineering for Women (Autonomous)

INTERNAL QUALITY ASSURANCE CELL

FACULTY INDUCTION PROGRAM ON 31.08.2024

FEEDBACK

Faculty Name: BRINDHA.S
Designation/Department: AP/IT
E-mail: sbrindha@vcew.ac.in
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College: VCEW

S.No.	Performance Criteria	Rating				
		Excellent	Good	Average	Fair	Poor
1	Presentation	✓				
2	Arrangements	✓				
3	Content delivered by Experts	✓				
4	Overall performance of program	✓				

Experts	Key Takeaway
Prof.Dr.S.Kuppuswami, Executive Director, VEI	1. How to be a great Teacher 2. Triggering Interest along student's 3. About Communication
Dr.KCK.Vijayakumar, Principal, VCEW	1. Learn How To Teach 2. Learn Many Process of Teaching 3. How to give technical knowledge though ow Teaching
Dr.S.R.Kannan, HoD/S&H, VCEW	1. Meaning for Harmony 2. Natural Acceptance 3. Transformation from Animal Consciou to Human Consciou
Dr.C.Poongodi, HoD/CSE, VCEW	1. Life-Long Learning 2. In-depth Learning 3. Daily Updation on Real World Activities
Dr.M.Sayeekumar, HoD/CST, VCEW	1. Moodle platform 2. Vivid 3. How to handle vivid and store data's
Dr.C.Uthayakumar, Director/IQAC, VCEW	1. outcome based education (Short & long term) 2. Continuous Quality Improvement 3. PSO

Any other Comments:

S.Brindha 31/08/24

Signature

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VCEW/QM/IQAC/FIP/013 A

College of Engineering for Women (Autonomous)

INTERNAL QUALITY ASSURANCE CELL

FACULTY INDUCTION PROGRAM ON 31.08.2024

FEEDBACK

Faculty Name: R. Senthil Kumar
Designation/Department: AP/CST
E-mail: Senthilkumarcst@vcew.ac.in Mobile Number: 8124137550
College: VCEW

S.No.	Performance Criteria	Rating				
		Excellent	Good	Average	Fair	Poor
1	Presentation	✓				
2	Arrangements		✓			
3	Content delivered by Experts		✓			
4	Overall performance of program		✓			

Experts	Key Takeaway
Prof.Dr.S.Kuppuswami, Executive Director, VEI	1. How to improve our communication ? 2. How to behave with society ? 3. To keep time management
Dr.KCK.Vijayakumar, Principal, VCEW	1. To improve our teaching skills 2. Feed the students with clear ideas concepts 3. How to active in all times ?
Dr.S.R.Kannan, HoD/S&H, VCEW	1. Treat the humans equally 2. Reduce our ego in family & society 3. Spending more time with our family
Dr.C.Poongodi, HoD/CSE, VCEW	1. Learning methodology 2. Technical learning & life long learning 3. updating ourselves.
Dr.M.Sayeekumar, HoD/CST, VCEW	1. Opensource S/W techniques to implement 2. VIVID techniques 3. Online teaching methods using medias
Dr.C.Uthayakumar, Director/IQAC, VCEW	1. Blooms taxonomy methods 2. 3. Vision & mission of our institution is mapped clearly

Any other Comments: Entire session was very useful and it's applicable for our life.

R Senthil Kumar
Signature
R Senthil Kumar
AP/CST

VIVEKANANDHA

VCEW/QM/IQAC/FIP/013 A

College of Engineering for Women (Autonomous)

INTERNAL QUALITY ASSURANCE CELL

FACULTY INDUCTION PROGRAM ON 31.08.2024

FEEDBACK

Faculty Name: Dr.K. LATHA
Designation/Department: AP / Chemistry
E-mail: lathachemistry@vcew.ac.in Mobile Number: 9976586890
College: VCEW

S.No.	Performance Criteria	Rating				
		Excellent	Good	Average	Fair	Poor
1	Presentation	✓				
2	Arrangements	✓				
3	Content delivered by Experts	✓				
4	Overall performance of program	✓				

Experts	Key Takeaway
Prof.Dr.S.Kuppuswami, Executive Director, VEI	1. How a great teacher 2. To handle classes by triggering their interest 3. Regarding - transformation of message to students
Dr.KCK.Vijayakumar, Principal, VCEW	1. How to being a brilliant teacher 2. Continous & creative learning 3. How to satisfy students in classes
Dr.S.R.Kannan, HoD/S&H, VCEW	1. Human values 2. Natural acceptance 3. Know about Ethical values Ice breakers, mind map
Dr.C.Poongodi, HoD/CSE, VCEW	1. Technology based skills 2. Life long learning 3. Know about ice breakers & mind map
Dr.M.Sayeekumar, HoD/CST, VCEW	1. Know about softwares 2. Explains especially moodle 3. Learned to store data in software
Dr.C.Uthayakumar, Director/IQAC, VCEW	1. Learn about outcome based Education 2. Cause & effects in Education 3. continuous quality improvement

Any other Comments:

K.Latha
Signature

VIVEKANANDHA

VCEW/QM/IQAC/FIP/013 A

College of Engineering for Women (Autonomous)

INTERNAL QUALITY ASSURANCE CELL

FACULTY INDUCTION PROGRAM ON 31.08.2024

FEEDBACK

Faculty Name: Dr. P. PUSHPAVALLI

Designation/Department: AP / TAMIL

E-mail: pushpavalli@vcew.ac.in Mobile Number: 9942297885

College: VCEW

S.No.	Performance Criteria	Rating				
		Excellent	Good	Average	Fair	Poor
1	Presentation	✓				
2	Arrangements	✓				
3	Content delivered by Experts	✓				
4	Overall performance of program	✓				

Experts	Key Takeaway
Prof.Dr.S.Kuppuswami, Executive Director, VEI	1. 2. Excellent Example to Life Long Learning 3.
Dr.KCK.Vijayakumar, Principal, VCEW	1. Best Teacher Examples 2. Very good self activities 3.
Dr.S.R.Kannan, HoD/S&H, VCEW	1. Very good Explanation for Human values. 2. day to day Human values 3.
Dr.C.Poongodi, HoD/CSE, VCEW	1. 2. Current Teaching Learning Tools. 3.
Dr.M.Sayeekumar, HoD/CST, VCEW	1. Very good moodle Platform 2. Different between moodle and GeR 3.
Dr.C.Uthayakumar, Director/IQAC, VCEW	1. OBE very good Explanation 2. Outcome Explanation is very good. 3.

Any other Comments:

Signature 31/8/24

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VCEW/QM/IQAC/FIP/013 A

College of Engineering for Women (Autonomous)

INTERNAL QUALITY ASSURANCE CELL

FACULTY INDUCTION PROGRAM ON 31.08.2024

FEEDBACK

Faculty Name: k.G. chithra
Designation/Department: Assistant Professor/CSE
E-mail: chithra@vcew.ac.in Mobile Number: 9677539112
College: VCEW

S.No.	Performance Criteria	Rating				
		Excellent	Good	Average	Fair	Poor
1	Presentation	✓				
2	Arrangements		✓			
3	Content delivered by Experts		✓			
4	Overall performance of program		✓			

Experts	Key Takeaway
Prof.Dr.S.Kuppuswami, Executive Director, VEI	1. Passion 2. Who is teacher - do knowledge transformation 3. Great teachers
Dr.KCK.Vijayakumar, Principal, VCEW	1. Brilliant teachers 2. Seeing, saying 3. Listening, action
Dr.S.R.Kannan, HoD/S&H, VCEW	1. Desires 2. Human values or prosperous 3. humanity on students
Dr.C.Poongodi, HoD/CSE, VCEW	1. Lifelong learning 2. Technology based education 3. Give space for students to ask questions
Dr.M.Sayeekumar, HoD/CST, VCEW	1. Linux 2. moodle tool 3. Additional options than GCR.
Dr.C.Uthayakumar, Director/IQAC, VCEW	1. Outcome based education 2. Cause-effect Relationship 3. Bloom's taxonomy.

Any other Comments:

K.G. Chithra

Signature

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VCEW/QM/IQAC/FIP/013 A

College of Engineering for Women (Autonomous)

INTERNAL QUALITY ASSURANCE CELL

FACULTY INDUCTION PROGRAM ON 31.08.2024

FEEDBACK

Faculty Name: G.Madhumitha
Designation/Department: AP/EEE
E-mail: madhumitha@VLEW.ac.in
Mobile Number: 9384910649
College: VCEW

S.No.	Performance Criteria	Rating				
		Excellent	Good	Average	Fair	Poor
1	Presentation	✓				
2	Arrangements	✓				
3	Content delivered by Experts	✓				
4	Overall performance of program	✓				

Experts	Key Takeaway
Prof.Dr.S.Kuppuswami, Executive Director, VEI	1. Four Methods of Teaching style. 2. Communication Skills modes. 3. Self-Development.
Dr.KCK.Vijayakumar, Principal, VCEW	1. Art of Being good Teacher. 2. Reality is all about your enthusiasm. 3. Elements are Critical, learning is not about Teaching Methods.
Dr.S.R.Kannan, HoD/S&H, VCEW	1. Thoughts about to speak Humans Values. 2. Self-question and answers. 3. Improve ours human values.
Dr.C.Poongodi, HoD/CSE, VCEW	1. Learning Enabled with Teachings Methods. 2. Life-long-self-learning other than subject knowledge. 3. Develop self learning and process Everyday.
Dr.M.Sayeekumar, HoD/CST, VCEW	1. Details about Moodles 2. Softwares, systems Details. 3.
Dr.C.Uthayakumar, Director/IQAC, VCEW	1. Traditional Based Education process. 2. Effects Relationship in Education. (Inputs, outputs, outcomes) 3. Quality Improvement (Plan → Do → Check → Act).

Any other Comments:

Signature

VIVEKANANDHA

VCEW/QM/IQAC/FIP/013 A

College of Engineering for Women (Autonomous)

INTERNAL QUALITY ASSURANCE CELL

FACULTY INDUCTION PROGRAM ON 31.08.2024

FEEDBACK

Faculty Name: Dr. J. SARANYA
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E-mail: saranyajmaths@vctw.ac.in Mobile Number: 9750040450
College: VCEW

S.No.	Performance Criteria	Rating				
		Excellent	Good	Average	Fair	Poor
1	Presentation	✓				
2	Arrangements	✓				
3	Content delivered by Experts	✓				
4	Overall performance of program	✓				

Experts	Key Takeaway
Prof.Dr.S.Kuppuswami, Executive Director, VEI	1. Vital Role of Teacher 2. Teacher's Responsibility 3. How to become a great teacher.
Dr.KCK.Vijayakumar, Principal, VCEW	1. Art of being a brilliant Teacher 2. Smart way of approach to deliver the 3. message of book chapter.
Dr.S.R.Kannan, HoD/S&H, VCEW	1. Importance of human values 2. Respect the Students 3.
Dr.C.Poongodi, HoD/CSE, VCEW	1. Delivered clearly about 2. "Technologies in life long learning" 3.
Dr.M.Sayeekumar, HoD/CST, VCEW	1. VIVIT - Moodle 2. Linune 3.
Dr.C.Uthayakumar, Director/IQAC, VCEW	1. Outcome based Education Vs Traditional Education process 2. Continuous Quality Improvement. 3. Bloom Tanonomy

Any other Comments: NIL

Signature

VIVEKANANDHA

VCEW/QM/IQAC/FIP/013 A

College of Engineering for Women (Autonomous)

INTERNAL QUALITY ASSURANCE CELL

FACULTY INDUCTION PROGRAM ON 31.08.2024

FEEDBACK

Faculty Name: H. Jayabharathi
Designation/Department: Assistant professor of English
E-mail: jayabharathi@vcew.ac.in Mobile Number: 9500973744
College: VCEW

S.No.	Performance Criteria	Rating				
		Excellent	Good	Average	Fair	Poor
1	Presentation	✓				
2	Arrangements	✓				
3	Content delivered by Experts	✓				
4	Overall performance of program	✓				

Experts	Key Takeaway
Prof.Dr.S.Kuppuswami, Executive Director, VEI	1. What is the role of teacher? 2. passion on teaching 3. 5 P formula
Dr.KCK.Vijayakumar, Principal, VCEW	1. Seeing / learning / listening / Doing 2. Fundamentals of Teaching 3. Activity - To engage the students
Dr.S.R.Kannan, HoD/S&H, VCEW	1. Desires 2. Human values with examples 3. What makes you happy as a human?
Dr.C.Poongodi, HoD/CSE, VCEW	1. Learning 2. what we do during the classroom? 3. List of activity to use in the classroom
Dr.M.Sayeekumar, HoD/CST, VCEW	1. Google classroom 2. To know about VIVIT 3. How to upload subject details in VIVIT.
Dr.C.Uthayakumar, Director/IQAC, VCEW	1. Outcome based Education 2. Cause effect relationship in Education 3. Quality improvement

Any other Comments:

H. Jayabharathi 31/8/24
Signature

VIVEKANANDHA

VCEW/QM/IQAC/FIP/013 A

College of Engineering for Women (Autonomous)

INTERNAL QUALITY ASSURANCE CELL

FACULTY INDUCTION PROGRAM ON 31.08.2024

FEEDBACK

Faculty Name: S. Indumathi
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E-mail: indumathicse@vcew.ac.in
Mobile Number: 9677349875
College: VCEW

S.No.	Performance Criteria	Rating				
		Excellent	Good	Average	Fair	Poor
1	Presentation	✓				
2	Arrangements	✓				
3	Content delivered by Experts	✓				
4	Overall performance of program		✓			

Experts	Key Takeaway
Prof.Dr.S.Kuppuswami, Executive Director, VEI	1. Education 2. Types of teacher 3. Great teacher
Dr.KCK.Vijayakumar, Principal, VCEW	1. seeing, saying, listing and doing 2. How to become a brilliant teacher 3. How to become a Prepare a class & take class
Dr.S.R.Kannan, HoD/S&H, VCEW	1. UHV 2. How to valuate the persons 3. How to become a comfotable Life.
Dr.C.Poongodi, HoD/CSE, VCEW	1. How to learn in life long 2. How to improve our tech skills 3. ways of teaching
Dr.M.Sayeekumar, HoD/CST, VCEW	1. Online tools 2. Moodle Platform 3. Useage of Moodle.
Dr.C.Uthayakumar, Director/IQAC, VCEW	1. vission & mission 2. PO & Co 3. SPO & KL.

Any other Comments:

Signature

VIVEKANANDHA

VCEW/QM/IQAC/FIP/013 A

College of Engineering for Women (Autonomous)

INTERNAL QUALITY ASSURANCE CELL

FACULTY INDUCTION PROGRAM ON 31.08.2024

FEEDBACK

Faculty Name: Dr.A.V.SANTHOSH BABU
Designation/Department: PROFESSOR / IT
E-mail: Santhoshbabu@vcew.ac.in Mobile Number: 9944942283
College: VCEW

S.No.	Performance Criteria	Rating				
		Excellent	Good	Average	Fair	Poor
1	Presentation	✓				
2	Arrangements	✓				
3	Content delivered by Experts	✓				
4	Overall performance of program	✓				

Experts	Key Takeaway
Prof.Dr.S.Kuppuswami, Executive Director, VEI	1. Communication Skills 2. 3.
Dr.KCK.Vijayakumar, Principal, VCEW	1. The Art of Being a Brilliant Teache 2. 3.
Dr.S.R.Kannan, HoD/S&H, VCEW	1. Universal Human values 2. 3.
Dr.C.Poongodi, HoD/CSE, VCEW	1. Life Long Learning 2. 3.
Dr.M.Sayeekumar, HoD/CST, VCEW	1. Moodle. 2. 3.
Dr.C.Uthayakumar, Director/IQAC, VCEW	1. Outcome Based Education 2. 3.

Any other Comments: NIL

31/8/2024
Signature
Dr.A.V.SANTHOSH BABU
IT

VIVEKANANDHA

VCEW/QM/IQAC/FIP/013 A

College of Engineering for Women (Autonomous)

INTERNAL QUALITY ASSURANCE CELL

FACULTY INDUCTION PROGRAM ON 31.08.2024

FEEDBACK

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College: VCEW

S.No.	Performance Criteria	Rating				
		Excellent	Good	Average	Fair	Poor
1	Presentation	✓				
2	Arrangements	✓				
3	Content delivered by Experts	✓				
4	Overall performance of program	✓				

Experts	Key Takeaway
Prof.Dr.S.Kuppuswami, Executive Director, VEI	1. Key to be a great teacher. 2. 3.
Dr.KCK.Vijayakumar, Principal, VCEW	1. Key to Brilliant teaching. 2. 3.
Dr.S.R.Kannan, HoD/S&H, VCEW	1. Key to Human values. 2. 3.
Dr.C.Poongodi, HoD/CSE, VCEW	1. Key to Life long learning & Technology learning. 2. 3.
Dr.M.Sayeekumar, HoD/CST, VCEW	1. Usage of Moodle 2. 3.
Dr.C.Uthayakumar, Director/IQAC, VCEW	1. Key points regarding CO's, PO's 2. 3.

Any other Comments:

S. Keerthini 31/8/24

Signature

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VCEW/QM/IQAC/FIP/013 A

College of Engineering for Women (Autonomous)

INTERNAL QUALITY ASSURANCE CELL

FACULTY INDUCTION PROGRAM ON 31.08.2024

FEEDBACK

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College: Vivekanandha College of Engineering for Women

S.No.	Performance Criteria	Rating				
		Excellent	Good	Average	Fair	Poor
1	Presentation	✓				
2	Arrangements		✓			
3	Content delivered by Experts	✓				
4	Overall performance of program	✓				

Experts	Key Takeaway
Prof.Dr.S.Kuppuswami, Executive Director, VEI	1. Learned about Education and Great teachers 2. 3.
Dr.KCK.Vijayakumar, Principal, VCEW	1. Learned how to become a brilliant teacher 2. 3.
Dr.S.R.Kannan, HoD/S&H, VCEW	1. Learned human values to follows in life 2. 3.
Dr.C.Poongodi, HoD/CSE, VCEW	1. Learned how to use technology based education 2. 3.
Dr.M.Sayeekumar, HoD/CST, VCEW	1. Learned about moodle platform 2. 3.
Dr.C.Uthayakumar, Director/IQAC, VCEW	1. Outcome based education. 2. 3.

Any other Comments:

Signature
(V. Pachamuthu)

VIVEKANANDHA

VCEW/QM/IQAC/FIP/013 A

College of Engineering for Women (Autonomous)

INTERNAL QUALITY ASSURANCE CELL

FACULTY INDUCTION PROGRAM ON 31.08.2024

FEEDBACK

Faculty Name: S. Johnson Karunakaran
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E-mail: johnsonkarunakaran9496@gmail.com Mobile Number: 8883758784
College: VCEW

S.No.	Performance Criteria	Rating				
		Excellent	Good	Average	Fair	Poor
1	Presentation	✓				
2	Arrangements	✓				
3	Content delivered by Experts	✓				
4	Overall performance of program	✓				

Experts	Key Takeaway
Prof.Dr.S.Kuppuswami, Executive Director, VEI	1. Categories of Teachers 2. modes of Communication 3.
Dr.KCK.Vijayakumar, Principal, VCEW	1. How to become a brilliant 2. Teacher ? 3.
Dr.S.R.Kannan, HoD/S&H, VCEW	1. Human values 2. 3.
Dr.C.Poongodi, HoD/CSE, VCEW	1. Technology based learning 2. Life Long Learning 3.
Dr.M.Sayeekumar, HoD/CST, VCEW	1. Features of moodles 2. 3.
Dr.C.Uthayakumar, Director/IQAC, VCEW	1. Outcome Based Education 2. 3.

Any other Comments: –

S. Johnson
31/8/24
Signature

VIVEKANANDHA

VCEW/QM/IQAC/FIP/013 A

College of Engineering for Women (Autonomous)

INTERNAL QUALITY ASSURANCE CELL

FACULTY INDUCTION PROGRAM ON 31.08.2024

FEEDBACK

Faculty Name: A. Saranyadevi
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E-mail: saranyadevi@vcew.ac.in Mobile Number: 97888 68301
College: VCEW

S.No.	Performance Criteria	Rating				
		Excellent	Good	Average	Fair	Poor
1	Presentation	✓				
2	Arrangements	✓				
3	Content delivered by Experts	✓				
4	Overall performance of program	✓				

Experts	Key Takeaway
Prof.Dr.S.Kuppuswami, Executive Director, VEI	1. 5-P formula to become a successful teacher 2. Common Sense 3. Quotes on teachers
Dr.KCK.Vijayakumar, Principal, VCEW	1. Teaching is an art (Seeing, Saying, listening, doing) 2. Teaching is hardwork but it is heart work 3. How should teaching be
Dr.S.R.Kannan, HoD/S&H, VCEW	1. Know about human values 2. Know about physical & fulfillment 3. decide to be happiness based on
Dr.C.Poongodi, HoD/CSE, VCEW	1. Way to make the class interactive Conscious 2. Technology based learning based on technology 3. Lifelong learning
Dr.M.Sayeekumar, HoD/CST, VCEW	1. GCR 2. Moodle 3. Mindmap
Dr.C.Uthayakumar, Director/IQAC, VCEW	1. Outcome based education 2. Condition Quality improvement 3. Plan do Act check.

Any other Comments:

Signature 2/9/24

VCEW/QM/IQAC/FIP/013 A

VIVEKANANDHA

College of Engineering for Women (Autonomous)

INTERNAL QUALITY ASSURANCE CELL

FACULTY INDUCTION PROGRAM ON 31.08.2024

FEEDBACK

Faculty Name: Dr. N. SUBRAMANIAN
Designation/Department: ASP/BT
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College: VCEW

S.No.	Performance Criteria	Rating				
		Excellent	Good	Average	Fair	Poor
1	Presentation	✓				
2	Arrangements	✓				
3	Content delivered by Experts	✓				
4	Overall performance of program	✓				

Experts	Key Takeaway
Prof.Dr.S.Kuppuswami, Executive Director, VEI	1. Inspired to become a great 2. teacher. Shared expertise in education. 3. useful points related to teaching and female students
Dr.KCK.Vijayakumar, Principal, VCEW	1. Activity based session and really 2. interactive session and discussed points 3. related to Art of Great Teacher Inspired to learn secrets of good teaching book
Dr.S.R.Kannan, HoD/S&H, VCEW	1. universal Human values and its 2. importance for a teaching 3. professional.
Dr.C.Poongodi, HoD/CSE, VCEW	1. Life long learning 2. Importance of learning 3.
Dr.M.Sayeekumar, HoD/CST, VCEW	1. comparision between google classroom 2. and Moodle. 3. Advantages of using Moodle over GCR
Dr.C.Uthayakumar, Director/IQAC, VCEW	1. outcome Based Education 2. Importance of OBE. 3. plan, do, check, Act related to continuous quality improvement.

Any other Comments:

Signature 3/9/2024

VIVEKANANDHA

VCEW/QM/IQAC/FIP/013 A

College of Engineering for Women (Autonomous)

INTERNAL QUALITY ASSURANCE CELL

FACULTY INDUCTION PROGRAM ON 31.08.2024

FEEDBACK

Faculty Name: P. SAKTHI
Designation/Department: AP/Maths
E-mail: praneeshsakthi@gmail.com Mobile Number: 9095150433
College: VCEW

S.No.	Performance Criteria	Rating				
		Excellent	Good	Average	Fair	Poor
1	Presentation		✓			
2	Arrangements		✓			
3	Content delivered by Experts		✓			
4	Overall performance of program		✓			

Experts	Key Takeaway
Prof.Dr.S.Kuppuswami, Executive Director, VEI	1. Time is Precious. 2. Educators quality - great teacher. 3. Five principles - P.
Dr.KCK.Vijayakumar, Principal, VCEW	1. Faculty Art / Brilliant - heart works 2. Role of Brilliant teacher. 3. ~~New~~ Teachers to qualities
Dr.S.R.Kannan, HoD/S&H, VCEW	1. Human values. → Humanity. 2. How to being a good human quality. 3. How to not being like animal.
Dr.C.Poongodi, HoD/CSE, VCEW	1. Life long learning. 2. Technical learning. 3. Interaction, IV, Demonstration, APPs.
Dr.M.Sayeekumar, HoD/CST, VCEW	1. GCR. 2. Upload materials, Assignments. 3. Editing the titles, including the concepts.
Dr.C.Uthayakumar, Director/IQAC, VCEW	1. OBE - Traditional Education process. 2. Effect Relationship in education. 3. Blooms Taxonomy,

Any other Comments:

—

P. Sakthi

Signature

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College of Engineering for Women (Autonomous)

INTERNAL QUALITY ASSURANCE CELL

FACULTY INDUCTION PROGRAM ON 31.08.2024

FEEDBACK

Faculty Name: T.GIRIJA
Designation/Department: AP/PHYSICS/S&H
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College: VCEW

S.No.	Performance Criteria	Rating				
		Excellent	Good	Average	Fair	Poor
1	Presentation	✓				
2	Arrangements	✓				
3	Content delivered by Experts	✓				
4	Overall performance of program	✓				

Experts	Key Takeaway
Prof.Dr.S.Kuppuswami, Executive Director, VEI	1. Education & Teaching 2. Human growth 3. five 'P'
Dr.KCK.Vijayakumar, Principal, VCEW	1. Teach from heart 2. Art of being a brilliant teacher 3. Multi sensory
Dr.S.R.Kannan, HoD/S&H, VCEW	1. Human value 2. Importance of Human value 3.
Dr.C.Poongodi, HoD/CSE, VCEW	1. Technology based learning 2. life long learning. 3. Teachers update your knowledge
Dr.M.Sayeekumar, HoD/CST, VCEW	1. Software 2. GCR 3. licence software and open source software
Dr.C.Uthayakumar, Director/IQAC, VCEW	1. Outcome Based Education 2. Traditional Education process. 3. Stakeholders satisfaction.

Any other Comments:

T. Girija.
Signature

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VCEW/QM/IQAC/FIP/013 A

College of Engineering for Women (Autonomous)

INTERNAL QUALITY ASSURANCE CELL

FACULTY INDUCTION PROGRAM ON 31.08.2024

FEEDBACK

Faculty Name: S.Keerthana
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College: VCEW

S.No.	Performance Criteria	Rating				
		Excellent	Good	Average	Fair	Poor
1	Presentation	✓				
2	Arrangements	✓				
3	Content delivered by Experts	✓				
4	Overall performance of program	✓				

Experts	Key Takeaway
Prof.Dr.S.Kuppuswami, Executive Director, VEI	1. To become a inspiring Teacher 2. Good Teacher qualities 3. P-formulas
Dr.KCK.Vijayakumar, Principal, VCEW	1. The Art of being a good Teacher 2. seeing, saying, doing, Listening 3. A commitment to Excellence
Dr.S.R.Kannan, HoD/S&H, VCEW	1. Human values 2. Humanity 3. How to Handle situations
Dr.C.Poongodi, HoD/CSE, VCEW	1. Life long Learning 2. Technology based Learning 3. Activities & Teaching method
Dr.M.Sayeekumar, HoD/CST, VCEW	1. GICR 2. Moodle 3. vidwid
Dr.C.Uthayakumar, Director/IQAC, VCEW	1. Outcome based Education 2. PSO 3. Bloom's Taxonomy

Any other Comments:

S.Keerthana
Signature

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VCEW/QM/IQAC/FIP/013 A

College of Engineering for Women (Autonomous)

INTERNAL QUALITY ASSURANCE CELL

FACULTY INDUCTION PROGRAM ON 31.08.2024

FEEDBACK

Faculty Name: Ms. J. Vishnu Priya
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E-mail: VishnuPriya@vcew.ac.in
Mobile Number: 7558191961
College: VCEW

S.No.	Performance Criteria	Rating				
		Excellent	Good	Average	Fair	Poor
1	Presentation	✓				
2	Arrangements	✓				
3	Content delivered by Experts	✓				
4	Overall performance of program	✓				

Experts	Key Takeaway
Prof.Dr.S.Kuppuswami, Executive Director, VEI	1. How the teachers should be ? 2. P- formulas 3. Inspiring teachers
Dr.KCK.Vijayakumar, Principal, VCEW	1. Art and Brilliant 2. Art of being a teacher 3. doing, Saying, listening, Seeing
Dr.S.R.Kannan, HoD/S&H, VCEW	1. Human values 2. Wisdom How to handle Situation ? 3. Humanity
Dr.C.Poongodi, HoD/CSE, VCEW	1. life long learning 2. Active learning 3. Technology based learning
Dr.M.Sayeekumar, HoD/CST, VCEW	1. Google glassroom 2. Vivid 3. Moodle
Dr.C.Uthayakumar, Director/IQAC, VCEW	1. Outcome Based education 2. Programme Specific outcome. 3. K-levels

Any other Comments: NIL

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VCEW/QM/IQAC/FIP/013 A

College of Engineering for Women (Autonomous)

INTERNAL QUALITY ASSURANCE CELL

FACULTY INDUCTION PROGRAM ON 31.08.2024

FEEDBACK

Faculty Name: Anjushree.S
Designation/Department: AP/BME
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Mobile Number: 9496723375
College: VCEW

S.No.	Performance Criteria	Rating				
		Excellent	Good	Average	Fair	Poor
1	Presentation	✓				
2	Arrangements	✓				
3	Content delivered by Experts	✓				
4	Overall performance of program	✓				

Experts	Key Takeaway
Prof.Dr.S.Kuppuswami, Executive Director, VEI	1. What is teaching? 2. Different categories of teachers 3. How teachers should be.
Dr.KCK.Vijayakumar, Principal, VCEW	1. Seeing, Saying, Listening, Doing 2. Role of good teacher 3. Art of being brilliant teacher
Dr.S.R.Kannan, HoD/S&H, VCEW	1. Universal human values 2. How to behave in a society 3. How to handle situation in good way
Dr.C.Poongodi, HoD/CSE, VCEW	1. Lifelong learning 2. Online learning 3. Activity based learning
Dr.M.Sayeekumar, HoD/CST, VCEW	1. GCR 2. GCR Vs Moodle 3. Moodle basics
Dr.C.Uthayakumar, Director/IQAC, VCEW	1. Outcome based teaching-learning process 2. Plan-do-check ack 3. Program & Program Specific Outcomes

Any other Comments:

Signature

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VCEW/QM/IQAC/FIP/013 A

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INTERNAL QUALITY ASSURANCE CELL

FACULTY INDUCTION PROGRAM ON 31.08.2024

FEEDBACK

Faculty Name: J.BOOPATHIRAJA
Designation/Department: AP|MATHEMATICS
E-mail: boopathiraja@vcew.ac.in Mobile Number: 9865596503.
College: VCEW

S.No.	Performance Criteria	Rating				
		Excellent	Good	Average	Fair	Poor
1	Presentation	✓				
2	Arrangements		✓			
3	Content delivered by Experts	✓				
4	Overall performance of program	✓				

Experts	Key Takeaway
Prof.Dr.S.Kuppuswami, Executive Director, VEI	1. Explained 5-P (Formulas) 2. We feel the Profession (Enjoyable) 3. Day by Day update our knowledge
Dr.KCK.Vijayakumar, Principal, VCEW	1. Seeing - Saying - listening - doing. 2. How to become a brilliant teacher. 3. Handled the Class lively - Heart teaching.
Dr.S.R.Kannan, HoD/S&H, VCEW	1. How to maintain the relationship 2. Difference between happy and Prosperous. 3. Human values is very important our life.
Dr.C.Poongodi, HoD/CSE, VCEW	1. Learning is a Continuous Processes 2. Various kind of online Platforms. 3.
Dr.M.Sayeekumar, HoD/CST, VCEW	1. Explained the online Platform GCR. 2. Moodle our College website More kind 3. of Activities. (like All aspects).
Dr.C.Uthayakumar, Director/IQAC, VCEW	1. Continuous Quality Improvement - Plan-do-check-out 2. Input-Processes - output - outcomes - Impact 3. Explained - (OBE - CO-PSO-PEO - BTL)

Any other Comments:

J.Boo

Signature

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INTERNAL QUALITY ASSURANCE CELL

FACULTY INDUCTION PROGRAM ON 31.08.2024

FEEDBACK

Faculty Name: N. Boobalan
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College: VCEW

S.No.	Performance Criteria	Rating				
		Excellent	Good	Average	Fair	Poor
1	Presentation	✓				
2	Arrangements	✓				
3	Content delivered by Experts	✓				
4	Overall performance of program	✓				

Experts	Key Takeaway
Prof.Dr.S.Kuppuswami, Executive Director, VEI	1. Personal care 2. growth mindset. 3. Continuous learning.
Dr.KCK.Vijayakumar, Principal, VCEW	1. Teaching methods 2. How to learn 3. How to teach.
Dr.S.R.Kannan, HoD/S&H, VCEW	1. Human values 2. Respecting Human 3.
Dr.C.Poongodi, HoD/CSE, VCEW	1. How to learn 2. How to teach 3. How to handle
Dr.M.Sayeekumar, HoD/CST, VCEW	1. Moodle operation 2. GCR facilities. 3.
Dr.C.Uthayakumar, Director/IQAC, VCEW	1. Outcome based learning. 2. Course outcome 3. Program outcome.

Any other Comments: NIL

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VCEW/QM/IQAC/FIP/013 A

College of Engineering for Women (Autonomous)

INTERNAL QUALITY ASSURANCE CELL

FACULTY INDUCTION PROGRAM ON 31.08.2024

FEEDBACK

Faculty Name: D. VIMALA
Designation/Department: AP / ECE
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College: VCEW

S.No.	Performance Criteria	Rating				
		Excellent	Good	Average	Fair	Poor
1	Presentation		✓			
2	Arrangements	✓				
3	Content delivered by Experts	✓				
4	Overall performance of program		✓			

Experts	Key Takeaway
Prof.Dr.S.Kuppuswami, Executive Director, VEI	1. Role and types of teachers 2. Effective communication b/w students & teachers. 3.
Dr.KCK.Vijayakumar, Principal, VCEW	1. Art of Being a good teacher 2. passionationate about teaching 3.
Dr.S.R.Kannan, HoD/S&H, VCEW	1. Human values 2. What are human values, we should possess 3. as a teacher.
Dr.C.Poongodi, HoD/CSE, VCEW	1. Life long learning helps to grow 2. Different activities used for teaching. 3.
Dr.M.Sayeekumar, HoD/CST, VCEW	1. Know about Moodle software 2. various facilities available in Moodle 3.
Dr.C.Uthayakumar, Director/IQAC, VCEW	1. Know about outcome based education 2. PEO and PSO. 3.

Any other Comments:

D. Vimala
Signature

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College of Engineering for Women (Autonomous)

INTERNAL QUALITY ASSURANCE CELL

FACULTY INDUCTION PROGRAM ON 31.08.2024

FEEDBACK

Faculty Name: D. JustinJose
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E-mail: justinjose@vcew.ac.in Mobile Number: 9789078816
College: VCEW

S.No.	Performance Criteria	Rating				
		Excellent	Good	Average	Fair	Poor
1	Presentation	✓				
2	Arrangements	✓				
3	Content delivered by Experts	✓				
4	Overall performance of program		✓			

Experts	Key Takeaway
Prof.Dr.S.Kuppuswami, Executive Director, VEI	1. Great Teacher (How to become a greate teacher 2. Definition for a good teacher by various professionals 3. Definition for Education
Dr.KCK.Vijayakumar, Principal, VCEW	1. Art of being a great teacher 2. How to become a brilliant Teacher 3. ~~Being Staying~~ Make the students interactive in the class
Dr.S.R.Kannan, HoD/S&H, VCEW	1. Human values 2. maintain relationships in the society 3. How to become a good human in the society
Dr.C.Poongodi, HoD/CSE, VCEW	1. Dynamic nature of Education 2. Life long learning 3. Activities that can be carried out in a classroom
Dr.M.Sayeekumar, HoD/CST, VCEW	1. Google classroom vs Moodle 2. Moodle key features 3. ViVid - Moodle
Dr.C.Uthayakumar, Director/IQAC, VCEW	1. Outcome based Education 2. Outcome based Education vs Traditional Education pros 3. Cause - Effect Relationship in Education

Any other Comments:

Signature

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VCEW/QM/IQAC/FIP/013 A

College of Engineering for Women (Autonomous)

INTERNAL QUALITY ASSURANCE CELL

FACULTY INDUCTION PROGRAM ON 31.08.2024

FEEDBACK

Faculty Name: CHRISTY GOLD BENCY.C

Designation/Department: AP/ Maths/S&H

E-mail: bencychristy@gmail.com Mobile Number: 7548871158

College: VCEW

S.No.	Performance Criteria	Rating				
		Excellent	Good	Average	Fair	Poor
1	Presentation	✓				
2	Arrangements	✓				
3	Content delivered by Experts	✓				
4	Overall performance of program	✓				

Experts	Key Takeaway
Prof.Dr.S.Kuppuswami, Executive Director, VEI	1. Gain ideas to become a great teacher 2. 3.
Dr.KCK.Vijayakumar, Principal, VCEW	1. Got Ideas regarding the art of being a 2. brilliant teacher 3.
Dr.S.R.Kannan, HoD/S&H, VCEW	1. Get human value ideas for healthy relationship 2. in family as well as working place 3.
Dr.C.Poongodi, HoD/CSE, VCEW	1. Get details related to deep learning 2. 3.
Dr.M.Sayeekumar, HoD/CST, VCEW	1. Know details about Moodle platform 2. know the difference between GCR & Moodle 3.
Dr.C.Uthayakumar, Director/IQAC, VCEW	1. Get Deep knowledge about vission, Mission 2. Geet details about PEO, PSO 3.

Any other Comments:

Bency.C

Signature

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VCEW/QM/IQAC/FIP/013 A

College of Engineering for Women (Autonomous)

INTERNAL QUALITY ASSURANCE CELL

FACULTY INDUCTION PROGRAM ON 31.08.2024

FEEDBACK

Faculty Name: KUSHPOO. R
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E-mail: kushpoo@vcew.ac.in Mobile Number: 9629303752
College: VCEW

S.No.	Performance Criteria	Rating				
		Excellent	Good	Average	Fair	Poor
1	Presentation	✓				
2	Arrangements	✓				
3	Content delivered by Experts		✓			
4	Overall performance of program		✓			

Experts	Key Takeaway
Prof.Dr.S.Kuppuswami, Executive Director, VEI	1. Improving communication skills - a guide 2. Handling the class in an effective way 3. Keys to become an inspiration to the Students
Dr.KCK.Vijayakumar, Principal, VCEW	1. Secrets of teaching 2. Passion in the Profession 3. The art of being a brilliant & successful teacher
Dr.S.R.Kannan, HoD/S&H, VCEW	1. Understanding the human values 2. Building a good & healthy relationship with Students 3. Respecting everyone's opinions
Dr.C.Poongodi, HoD/CSE, VCEW	1. The ways to improve learning technically. 2. Making interest among Students to learn a subject 3. various classroom tasks
Dr.M.Sayeekumar, HoD/CST, VCEW	1. Moodle - a brief guidance 2. Comparison b/w GICR & Moodle 3. The tools to be used in Moodle
Dr.C.Uthayakumar, Director/IQAC, VCEW	1. Outcome Based Education Methodology - Introduction 2. The outcomes of teaching 3. Teaching - learning systems

Any other Comments:

Signature
CR. KUSHPOO

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VCEW/QM/IQAC/FIP/013 A

College of Engineering for Women (Autonomous)

INTERNAL QUALITY ASSURANCE CELL

FACULTY INDUCTION PROGRAM ON 31.08.2024

FEEDBACK

Faculty Name: J. KAVIPRIYA
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Mobile Number: 8870545996
College: VCEW

S.No.	Performance Criteria	Rating				
		Excellent	Good	Average	Fair	Poor
1	Presentation	✓				
2	Arrangements		✓			
3	Content delivered by Experts	✓				
4	Overall performance of program		✓			

Experts	Key Takeaway
Prof.Dr.S.Kuppuswami, Executive Director, VEI	1. How to be a good teacher 2. Teachers-types 3. Five - P
Dr.KCK.Vijayakumar, Principal, VCEW	1. The Art of being a Good Teacher 2. Seeing, Saying, Doing, Listening 3. How to be a brilliant teacher
Dr.S.R.Kannan, HoD/S&H, VCEW	1. Human values 2. Relationship values 3. Animal Vs Human behaviour
Dr.C.Poongodi, HoD/CSE, VCEW	1. Technology based learning 2. Life Long Learning 3. How to satisfied yourself in Education / Teaching
Dr.M.Sayeekumar, HoD/CST, VCEW	1. Google class Room 2. moodle 3. Vivid (Vivekanandha Virtual Desk)
Dr.C.Uthayakumar, Director/IQAC, VCEW	1. Outcome Based Education (OBE) 2. OBE Vs Traditional Education Process 3. Cause - Effect Relationship in Education

Any other Comments: NIL

J. kavi 31/8/2024
Signature

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VCEW/QM/IQAC/FIP/013 A

College of Engineering for Women (Autonomous)

INTERNAL QUALITY ASSURANCE CELL

FACULTY INDUCTION PROGRAM ON 31.08.2024

FEEDBACK

Faculty Name: Mrs. A. SUMATHI
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E-mail: Sumathi@vcewac.in Mobile Number: 7708307133
College: VCEW

S.No.	Performance Criteria	Rating				
		Excellent	Good	Average	Fair	Poor
1	Presentation	✓				
2	Arrangements	✓				
3	Content delivered by Experts		✓			
4	Overall performance of program		✓			

Experts	Key Takeaway
Prof.Dr.S.Kuppuswami, Executive Director, VEI	1. Education & teaching 2. Which is the role of faculty Teacher 3. How to become a successful teacher
Dr.KCK.Vijayakumar, Principal, VCEW	1. The art of being a good teacher. 2. Brilliant Teacher 3. Multisensory teaching techniques.
Dr.S.R.Kannan, HoD/S&H, VCEW	1. Human values 2. Relationship 3. Values the other feelings.
Dr.C.Poongodi, HoD/CSE, VCEW	1. Technology based Enabled learning & life long self learning 2. How to learn 3. Activities inside classroom
Dr.M.Sayeekumar, HoD/CST, VCEW	1. Moodle platform - 2. LMS (G4CR), Tools 3. Student based
Dr.C.Uthayakumar, Director/IQAC, VCEW	1. outcomes Based Education 2. Effect relationship in Education 3. Continuous quality improvement

Any other Comments:

A. Sumathi 31/8/24
Signature

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VCEW/QM/IQAC/FIP/013 A

College of Engineering for Women (Autonomous)

INTERNAL QUALITY ASSURANCE CELL

FACULTY INDUCTION PROGRAM ON 31.08.2024

FEEDBACK

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S.No.	Performance Criteria	Rating				
		Excellent	Good	Average	Fair	Poor
1	Presentation	✓				
2	Arrangements		✓			
3	Content delivered by Experts	✓				
4	Overall performance of program	✓				

Experts	Key Takeaway
Prof.Dr.S.Kuppuswami, Executive Director, VEI	1. Five P 2. How to be a good teacher. 3.
Dr.KCK.Vijayakumar, Principal, VCEW	1. The art of Being a good Teacher 2. Brilliant Teacher. 3.
Dr.S.R.Kannan, HoD/S&H, VCEW	1. Human values. 2. How to value the human. 3. Happy vs Unhappy
Dr.C.Poongodi, HoD/CSE, VCEW	1. Technology based learning and 2. Life long learning 3.
Dr.M.Sayeekumar, HoD/CST, VCEW	1. learned about Moodle and OICR 2. VIVID 3. Mindmap
Dr.C.Uthayakumar, Director/IQAC, VCEW	1. outcome based education versus 2. Traditional education process. 3. Input → process → output → outcomes,

Any other Comments: —

31/8/24
Signature

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VCEW/QM/IQAC/FIP/013 A

College of Engineering for Women (Autonomous)

INTERNAL QUALITY ASSURANCE CELL

FACULTY INDUCTION PROGRAM ON 31.08.2024

FEEDBACK

Faculty Name: Dr. E. VEERAMANIPRIYA
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College: VCEW

S.No.	Performance Criteria	Rating				
		Excellent	Good	Average	Fair	Poor
1	Presentation		✓			
2	Arrangements		✓			
3	Content delivered by Experts	✓				
4	Overall performance of program		✓			

Experts	Key Takeaway
Prof.Dr.S.Kuppuswami, Executive Director, VEI	1. Roles of Teachers 2. Responsibilities of Teacher from good to great 3. How to become a great teacher
Dr.KCK.Vijayakumar, Principal, VCEW	1. The art of being good teacher 2. Teaching methods (seeing, saying, listening, doing) 3. Brilliant Teacher
Dr.S.R.Kannan, HoD/S&H, VCEW	1. Human Values 2. Value the other feelings 3. Balancing way of healthy relationship
Dr.C.Poongodi, HoD/CSE, VCEW	1. Life Long learning 2. How to learn? 3. How to make the students to learn?
Dr.M.Sayeekumar, HoD/CST, VCEW	1. Advanced Teaching & Learning Tools 2. Moodle platform 3. ViViD - LMS
Dr.C.Uthayakumar, Director/IQAC, VCEW	1. Outcome based Education basics 2. CGPA, Mark allotments 3. Effective relationship in Education

Any other Comments:

E.V
Signature
31/08/24

VIVEKANANDHA

VCEW/QM/IQAC/FIP/013 A

College of Engineering for Women (Autonomous)

INTERNAL QUALITY ASSURANCE CELL

FACULTY INDUCTION PROGRAM ON 31.08.2024

FEEDBACK

Faculty Name: S.J.DEEBAK
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E-mail: deebjay@gmail.com Mobile Number: 9047726888
College: VCEW

S.No.	Performance Criteria	Rating				
		Excellent	Good	Average	Fair	Poor
1	Presentation	✓				
2	Arrangements	✓				
3	Content delivered by Experts	✓				
4	Overall performance of program	✓				

Experts	Key Takeaway
Prof.Dr.S.Kuppuswami, Executive Director, VEI	1. How to Teach the Topic (Education) 2. Communication Skill, 3. Knowledge Dissemination.
Dr.KCK.Vijayakumar, Principal, VCEW	1. A Art of Being a Good Teaching 2. Miscellaneous Aspects, no 3. Management & Administrative.
Dr.S.R.Kannan, HoD/S&H, VCEW	1. Human Value 2. Normal Human value 3.
Dr.C.Poongodi, HoD/CSE, VCEW	1. Life long learning 2. learning in depth 3. Effect to learn / outcome base Learning
Dr.M.Sayeekumar, HoD/CST, VCEW	1. moodle learning 2. Diff from GCR to moodle learning. 3.
Dr.C.Uthayakumar, Director/IQAC, VCEW	1. Traditional Education Process Process 2. Def. of Teaching & learning 3. outcome base Result Produce, PSO CO, map

Any other Comments: —

31/8/24
Signature

VIVEKANANDHA

VCEW/QM/IQAC/FIP/013 A

College of Engineering for Women (Autonomous)

INTERNAL QUALITY ASSURANCE CELL

FACULTY INDUCTION PROGRAM ON 31.08.2024

FEEDBACK

Faculty Name: G. GOMATHI
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College: VCEW

S.No.	Performance Criteria	Rating				
		Excellent	Good	Average	Fair	Poor
1	Presentation		✓			
2	Arrangements	✓				
3	Content delivered by Experts	✓				
4	Overall performance of program		✓			

Experts	Key Takeaway
Prof.Dr.S.Kuppuswami, Executive Director, VEI	1. The art of teaching 2. 3.
Dr.KCK.Vijayakumar, Principal, VCEW	1. The art of being a brilliant teacher 2. 3.
Dr.S.R.Kannan, HoD/S&H, VCEW	1. Human values 2. 3.
Dr.C.Poongodi, HoD/CSE, VCEW	1. Technology learning 2. Life long learning 3.
Dr.M.Sayeekumar, HoD/CST, VCEW	1. Moodles platform 2. 3.
Dr.C.Uthayakumar, Director/IQAC, VCEW	1. Outcome based Education 2. 3.

Any other Comments:

31/8/24
Signature

VIVEKANANDHA

VCEW/QM/IQAC/FIP/013 A

College of Engineering for Women (Autonomous)

INTERNAL QUALITY ASSURANCE CELL

FACULTY INDUCTION PROGRAM ON 31.08.2024

FEEDBACK

Faculty Name: S. Gowsika
Designation/Department: AP/CST
E-mail: gowsika@vcew.ac.in.
Mobile Number: 6381451025
College: VCEW

S.No.	Performance Criteria	Rating				
		Excellent	Good	Average	Fair	Poor
1	Presentation	✓				
2	Arrangements		✓			
3	Content delivered by Experts		✓			
4	Overall performance of program		✓			

Experts	Key Takeaway
Prof.Dr.S.Kuppuswami, Executive Director, VEI	1. passionate towards teaching. 2. 3.
Dr.KCK.Vijayakumar, Principal, VCEW	1. Sensory learning. 2. 3.
Dr.S.R.Kannan, HoD/S&H, VCEW	1. Human values. 2. 3.
Dr.C.Poongodi, HoD/CSE, VCEW	1. Technology based learning and life long learning. 2. 3.
Dr.M.Sayeekumar, HoD/CST, VCEW	1. Introduction to moodle 2. 3.
Dr.C.Uthayakumar, Director/IQAC, VCEW	1. Outcome based education. 2. 3.

Any other Comments:

S. Gowsika.
Signature

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VCEW/QM/IQAC/FIP/013 A

College of Engineering for Women (Autonomous)

INTERNAL QUALITY ASSURANCE CELL

FACULTY INDUCTION PROGRAM ON 31.08.2024

FEEDBACK

Faculty Name: Dr. V. Rathi

Designation/Department: AP / Physics

E-mail: rathivasanth321@gmail.com Mobile Number: 9842350380

College: VCEW

S.No.	Performance Criteria	Rating				
		Excellent	Good	Average	Fair	Poor
1	Presentation	✓				
2	Arrangements	✓				
3	Content delivered by Experts	✓				
4	Overall performance of program	✓				

Experts	Key Takeaway
Prof.Dr.S.Kuppuswami, Executive Director, VEI	1. Passion towards a good & great teacher. 2. understand your role. 3. 5- P's.
Dr.KCK.Vijayakumar, Principal, VCEW	1. Art of great teacher. 2. Seeing, saying, doing & Listening 3. Activity.
Dr.S.R.Kannan, HoD/S&H, VCEW	1. Human values. 2. How to inculcate with students. 3. keep good rapo with students.
Dr.C.Poongodi, HoD/CSE, VCEW	1. Life Long learning 2. How we want to make ourself a 3. good learner.
Dr.M.Sayeekumar, HoD/CST, VCEW	1. * came to know the relent app's. 2. How to log in in moodle. 3. what are the advantage of moodle.
Dr.C.Uthayakumar, Director/IQAC, VCEW	1. OBE 2. vision & mission. 3. mapping.

Any other Comments:

* Arranging a program in this idea hall makes to feel very Comfort & Professional leather than seminar Hall.
* Addressed with 9 different Topics is different & interested,

Signature

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College of Engineering for Women (Autonomous)

INTERNAL QUALITY ASSURANCE CELL

FACULTY INDUCTION PROGRAM ON 31.08.2024

FEEDBACK

Faculty Name: S.Sharmila.
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E-mail: sharmila@vcew.ac.in. Mobile Number: 6383117511.
College: VCEW

S.No.	Performance Criteria	Rating				
		Excellent	Good	Average	Fair	Poor
1	Presentation	✓				
2	Arrangements	✓				
3	Content delivered by Experts	✓				
4	Overall performance of program	✓				

Experts	Key Takeaway
Prof.Dr.S.Kuppuswami, Executive Director, VEI	1. 'P' letter 5 points (important) 2. inspire teacher. 3. Update data & History etc
Dr.KCK.Vijayakumar, Principal, VCEW	1. Art of being a good teacher. 2. Teaching - better retention 3. Do smart work.
Dr.S.R.Kannan, HoD/S&H, VCEW	1. Being a human, kind 2. Respect all human beings. 3. Happiness
Dr.C.Poongodi, HoD/CSE, VCEW	1. Activity Given (different way) 2. Be friendly with students. 3. Recent trends (Applications)
Dr.M.Sayeekumar, HoD/CST, VCEW	1. Moodle - login. 2. Diff bet teachers & students. 3. Advantages of moodle, compared to GCR.
Dr.C.Uthayakumar, Director/IQAC, VCEW	1. OBE. 2. Impact society benefit 3. Curriculam, Assessment related topics.

Any other Comments: —

Signature

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College of Engineering for Women (Autonomous)

INTERNAL QUALITY ASSURANCE CELL

FACULTY INDUCTION PROGRAM ON 31.08.2024

FEEDBACK

Faculty Name: B.Madhubala
Designation/Department: AP/ IT
E-mail: madhubalait @vcew.ac.in Mobile Number: 9566660700
College: VCEW

S.No.	Performance Criteria	Rating				
		Excellent	Good	Average	Fair	Poor
1	Presentation	✓				
2	Arrangements	✓				
3	Content delivered by Experts	✓				
4	Overall performance of program	✓				

Experts	Key Takeaway
Prof.Dr.S.Kuppuswami, Executive Director, VEI	1. Role of Teacher 2. 5P's - explained 3. Communication Skill, Common sense
Dr.KCK.Vijayakumar, Principal, VCEW	1. Art of being good Teacher 2. Brilliant Teacher 3. key points to become brilliant Teacher
Dr.S.R.Kannan, HoD/S&H, VCEW	1. Human values 2. Happiness 3. Prosperous
Dr.C.Poongodi, HoD/CSE, VCEW	1. Life long learning 2. Activity learning 3. Self learning
Dr.M.Sayeekumar, HoD/CST, VCEW	1. Moodle Software 2. Purpose of Moodle 3. VIVID
Dr.C.Uthayakumar, Director/IQAC, VCEW	1. Outcome based Education 2. About vision Mission 3. cause - Effect Relationship in Education

Any other Comments: —

B.M 31/8/24.

Signature

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VCEW/QM/IQAC/FIP/013 A

College of Engineering for Women (Autonomous)

INTERNAL QUALITY ASSURANCE CELL

FACULTY INDUCTION PROGRAM ON 31.08.2024

FEEDBACK

Faculty Name: Dr. N. Dhayananth

Designation/Department: ASP / Biotechnology

E-mail: dhayananth@vcew.ac.in Mobile Number: 9486389024

College: VCEW.

S.No.	Performance Criteria	Rating				
		Excellent	Good	Average	Fair	Poor
1	Presentation		✓			
2	Arrangements		✓			
3	Content delivered by Experts	✓				
4	Overall performance of program	✓				

Experts	Key Takeaway
Prof.Dr.S.Kuppuswami, Executive Director, VEI	1. Insights of Education & Teaching 2. Best teacher thoughts & attitude. 3. Teaching Values.
Dr.KCK.Vijayakumar, Principal, VCEW	1. Mindfullness of good teacher 2. Teaching-learning process. 3.
Dr.S.R.Kannan, HoD/S&H, VCEW	1. Human Values. 2. constructive criticism. 3.
Dr.C.Poongodi, HoD/CSE, VCEW	1. Technology based learning methods. 2. 3.
Dr.M.Sayeekumar, HoD/CST, VCEW	1. Online / Software tools aid for 2. better teachings. 3.
Dr.C.Uthayakumar, Director/IQAC, VCEW	1. Outcome based Education. 2. Thoughts Process. 3.

Any other Comments: Good.

Signature

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College of Engineering for Women (Autonomous)

INTERNAL QUALITY ASSURANCE CELL

FACULTY INDUCTION PROGRAM ON 31.08.2024

FEEDBACK

Faculty Name: V. RAVITHA
Designation/Department: AP / CST
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College: Vivekanandha College of Engineering for Women

S.No.	Performance Criteria	Rating				
		Excellent	Good	Average	Fair	Poor
1	Presentation	✓				
2	Arrangements	✓				
3	Content delivered by Experts	✓				
4	Overall performance of program	✓				

Experts	Key Takeaway
Prof.Dr.S.Kuppuswami, Executive Director, VEI	1. Effective Communication 2. A Great Teacher 3. Five P- formula.
Dr.KCK.Vijayakumar, Principal, VCEW	1. Art of Brilliant Teacher 2. Four Types/part of teaching 3. Types of Teaches.
Dr.S.R.Kannan, HoD/S&H, VCEW	1. Universal Human Values 2. Relationship 3. Book:- How The other Half Dies?
Dr.C.Poongodi, HoD/CSE, VCEW	1. Life Long Learning 2. Technologies & Activities 3. 10 Benefits
Dr.M.Sayeekumar, HoD/CST, VCEW	1. Software & Webpage. 2. Vivekanandha Virtual Desk (ViViD) 3. Moodle Platforms
Dr.C.Uthayakumar, Director/IQAC, VCEW	1. OutCome Based Education 2. Student Centring Method 3. Plan-Do-Check-Act (Continuous Quality Improvement)

Any other Comments:

Signature

VIVEKANANDHA

VCEW/QM/IQAC/FIP/013 A

College of Engineering for Women (Autonomous)

INTERNAL QUALITY ASSURANCE CELL

FACULTY INDUCTION PROGRAM ON 31.08.2024

FEEDBACK

Faculty Name: A. Kanagavalli
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E-mail: kanagavalli@vcew.ac.in Mobile Number: 9524021025
College: VCEW

S.No.	Performance Criteria	Rating				
		Excellent	Good	Average	Fair	Poor
1	Presentation	✓				
2	Arrangements	✓				
3	Content delivered by Experts	✓				
4	Overall performance of program	✓				

Experts	Key Takeaway
Prof.Dr.S.Kuppuswami, Executive Director, VEI	1. Effective Communication 2. P-formula 3. Modes of Teacher.
Dr.KCK.Vijayakumar, Principal, VCEW	1. Role of Teacher 2. Types of Teacher 3. 4. Main parts of Teacher
Dr.S.R.Kannan, HoD/S&H, VCEW	1. Human Values 2. Life style, 3. Relationship & Prosperity
Dr.C.Poongodi, HoD/CSE, VCEW	1. Life Long Learning 2. Technology Based life long Learning 3. Benefits & General Activities.
Dr.M.Sayeekumar, HoD/CST, VCEW	1. Moodle platform. 2. Difference b/w CTCR & Moodle platform 3.
Dr.C.Uthayakumar, Director/IQAC, VCEW	1. OBE Vs Traditional Education process 2. Student Centering Method 3. Continuous Quality Improvement

Any other Comments:

Signature

CERTIFICATE

VIVEKANANDHA
COLLEGE OF ENGINEERING FOR WOMEN

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Tiruchengode - 637 205, Namakkal Dt. Tamilnadu. Website: www.vcenggw.ac.in

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Prof. Dr. M. KARUNANITHI
Chairman & Secretary

Certificate of Participation

This is to certify that Dr. / Mr. / Ms./ .....

has participated in the .....organized by the Internal

Quality Assurance Cell on .....

DIRECTOR IQAC

PRINCIPAL

Prof. Dr. M. KARUNANITHI
CHAIRMAN & SECRETARY