Teaching- Learning process : Seven Attributes of an Engineering Educator- An Introspection

Sangaraboina Shailaja\textsuperscript{1} and P.Vijaya Lakshmi\textsuperscript{2}

\textsuperscript{1}Department of English, S R University, Warangal-506371, Telangana, India
\textsuperscript{2}Department of English, S R Engineering College, Warangal-506371, Telangana, India

Email: shailaja.bdc@gmail.com

Abstract. Education is a tool to transfer knowledge from one to one or from one to many. It provides an opportunity for learners to construct and create experiences through learning. From times immemorial Learning has undergone drastic changes. In order to make learning effective and to meet the standards of millennial learners a new pedagogy, Teaching- Learning process, is introduced in the present Education system. The main aspects of Teaching- Learning process are Teacher, Learner, Learning process and learning environment. Instructing is a relationship which is set among three central focuses in Education- Teacher, Student and content delivery which involves setting appropriate learning experiences for students. The role of a teacher from conventional teaching to student-centric teaching varies. Now a teacher has to perform multiple roles apart from teaching and focusing on completion of syllabus. There is a need for a teacher to attend students needs, experiences, feelings and motivate them to understand the learning process appropriately. The Article focuses on the attributes of a teacher, especially an Engineering Educator. Additionally It also explores the personal experiences observed and retained during the process of teaching.

1. Introduction

Education is mostly recognized as the foundation of a progressive society. It can also be thought of as the transmission of the qualities and aggregated Information on a general public. There are numerous types of Knowledge and it is accessible at many places. It very well may be obtained through training, data, insight and experience. The learning sources are scholastic establishment with instructors, in libraries, in research papers, class procedures and in different associations. Knowledge though closely linked to education can also be acquired from learning skills and it also plays an important role in performance and output too. The obtaining of information has therefore been the thrust area throughout the world. Additionally, in India, there has been a culture of sharing the knowledge through the tradition of Guru-Shishya.

Teaching is one of the significant instrument of imparting knowledge. The main function of teaching is to make learning effective and its special function is to impart understanding and skill. Teaching is a social and cultural process, which is planned in order to enable an individual to learn something in his/her life. [5] It is a tool for creating conditions which assist in the growth of the learners mind and body. The earlier teaching practice was in between Guru and shishya, were Guru used to transfer the knowledge and students used to receive it. From an open air education, teaching shifted to classrooms. In a traditional or conventional classroom the teaching was in the mode of chalk and talk. Due to the regimented and teacher-centric classrooms there was a lack of collaboration...
between teachers and students. Teachers laid more emphasis on completion of syllabus, no matter whether the student understood or not, and on Examinations and results which lead to the improper alignment between Teaching and Learning.

Learning is a developmental, cognitive process where information is absorbed, processed and retained. It is also a scientific approach where learners learn through trial and error approach. Most of the learning theories and psychologists believe that learners should be provided an opportunity to construct knowledge as most of the learners learn because of need. They also believe that learning can be either a conscious or non-conscious process. Learning happens in a cultural context and involves social interaction which leads to the development of new capacities, skills, values, understanding and preferences. The goal of such learning is to increase individual and group experience. Learning in a formal atmosphere allows learn to learn far more of their culture than they are able to do by merely observing and imitating. Teaching and Education should be the main goals of learning from social perspective. Hence the learning process gets completed as a result of teaching. so, teaching and learning are very closely related.

The teaching-learning process aims at transmission of knowledge, imparting skills and formation of attitudes, values and behaviour. The main aim of teaching-learning process is to transform teacher-centric classrooms into student-centric classrooms. Curriculum, objectives, syllabus, activities etc. are designed keeping the learners need in consideration. Learners learn best when they are treated with respect, when their physical and cognitive environment is comfortable, when interaction with the facilitator is accessible and when learners take part in planning the learning activities. Student centric classrooms allows students to share the responsibility of a teacher giving a way to individual accountability.

The present professional education system faces significant challenges as it seeks to meet the demands and needs of the millennial learners. Teachers need to exercise a lot on new approaches to teach and learn and need to provide a conceptual framework to respond to the challenge of becoming a professional Engineering Educator. There is a need for a teacher to change their leadership style from directive to consultative, Understand the mindset of the students as students are with different disabilities and personalities, different socio-economic levels and diverse ethnic backgrounds. Now the role of a teacher is not a mere 'teacher' but a 'facilitator' with many attributes to make the teaching-learning process effective. It's a high time for Engineering educator to self analyze and respond to the challenges. There is a need to ask Questions like Why am I in this profession? what is my vision? How do I measure up to my own vision? This introspection gives rise to know the attributes of a successful Engineering Educator. This paper focuses on the seven attributes of an Engineering Educator.

2. Seven Attributes of an Engineering Educator

2.1. Adaptable
Teacher is always a learner. A Good teacher always realizes this fact. With the changing Education system there is always a change in curriculum, syllabus, plan of delivery, assessment mode etc. There is a need for the teacher to adapt the new challenges in due course of teaching. If we clearly observe the conventional method of teaching it was purely content based and teacher-centric. Teachers target was only to complete the syllabus, never known whether student understood the subject or not, and the assessment was only results or grades. Many teachers confined their learning to the limited syllabus. For example in a subject if there are six units, some teachers limited their teaching only to four units and remaining they left as a choice. Knowledgeable students were worried about the left syllabus, practiced the remaining units on their own. It was hard for the learner to learn, understand and present. It was a stressful learning with effect in cognitive levels. Instead if teacher completes the entire syllabus, stress on the student learning decreases. Another observation in conventional
education system is, heavy syllabus with large number of credits and syllabus was revised for every three to four years. This made teachers to get relaxed as there is no scope for extra learning.

Now in most of the Engineering colleges outcome Based Education (OBE) is in Practice. OBE is student-centric and with active learning methods. Here teacher is very careful in designing the syllabus and even to practice more effective ways of teaching. End results are not scaled in marks and grades but to test the Graduate attributes. This throws a challenge to the teacher to adapt the new methodologies in teaching. As Syllabus is reviewed every year (in many cases) it makes teacher a learner everyday in designing new syllabus, course plan with activities, preparing course material etc...Every day when teacher enters into a class delivers lecture keeping student learning levels in mind and continues the teaching-learning process effectively with his/her quality of adaptability. Thus teachers' adaptability becomes the basic attribute.

2.2. Empathetic
Earlier the teacher role was limited only to the classroom in the completion of syllabus, checking notes, conducting exams, awarding marks, giving punishments etc. It is believed and observed that teacher should be strict in the classroom. We still remember that some of the teachers used to carry canes to the classroom to control the students. Teacher in the process of teaching divided students into three disciplines like Merit, Average and Poor depending upon the marks they scored in the tests. Teachers concentration was only on the merit students ignoring others how good they may be in other activities. There was no balanced atmosphere in the classroom which lead to the lack of confidence in most of the students. we are sorry to say even now some teachers follow this traditional method of division of students in the classroom.

2.3. Innovative
Teaching strategies in the present Engineering Education made teachers to realize that students have different learning preferences and knowledge is hard to transfer. This thought gave rise to student-centric education where syllabus is designed according to the needs of the students. In a classroom we have students with different disabilities and personalities. To reach all the students a teacher must become a facilitator or a mentor. Creating a dynamic classroom environment, focusing on all the students interests, identifying their weak learning areas, motivating them, controlling attitudes and behaviours, making students as partners in designing products, projects and activities makes a teacher empathetic towards students learning process.

2.4. Unambiguous
How a teacher handles the first day of the class makes all the difference. Though it sounds absurd but it’s true. Generally the first day of the class teacher asks the names of the students, dictates syllabus and starts with the first unit. A sudden paradigm shift from one mode of learning (Intermediate) to other mode of learning (Engineering Education) students take time to get adjusted to the new environment and also they have lot of fears about the course and how to pursue. It is the duty of the teacher to maintain transparency regarding the course details. Giving students a sheet of syllabus copy will not serve the purpose. They should give clear details like what is the purpose of learning the course? why is it designed? how is it useful in future? what are the learning strategies? how activities are conducted? what is the assessment procedure (both internal and external)? what are course credits? etc. When each and every detail is clearly explained to the students, students get motivated and develop confidence. It also makes students to trust the teacher. So, Clarity in the course details and content delivery makes another important attribute of an engineer educator.

2.5. Approachable
In most our classroom TTT (Teachers talk time) is more rather than STT (Students talk time). Students never dare to raise their doubts in the classroom or in the staff room. Whatever teacher says becomes a note. If students get any doubt they have to resolve the issue on their own.[6]. This was the learning condition of the student in conventional teaching but now times changed. Millennial learners
are ready to communicate with the teachers even after the class hours. It is the responsibility of the teacher to give accessibility to the students either in the college (in the classroom, in the staff room or in leisure hours) or off campus (telephone calls, messages or through email). This sort of approach develops and strengthens the bond between the teachers and students which leads to the active learning process but it is observed that most of the students give calls for unnecessary reasons and may ask simple doubts. They may also give calls and send messages at odd hours. It is the duty of the teacher to set a policy of approach that when and what students should communicate with the teacher. This is also an another way of teaching professional discipline to them.

2.6. Effective Communicator

Human mind is a source of ideas, emotions, feelings, experiences and doubts. Unless he/she communicates or shares with others all these ideas, emotional urge will not be satisfied. Communication facilitates an individual to express his/her confidence and trust. A teacher should consider these elements to be an effective communicator. Communication does not limit its definition to the flow of language and thoughts. To be a good communicator one should be an active listener, empathetic, consider the psychological factors of others. Patience, positive attitude, courtesy, pleasant temperamental characters makes a teacher a very good communicator. If teacher practices these qualities students feel that he/she is the right person to communicate and share their feelings. If we rightly observe for a class, if six teachers take the class students get connected to only one or two teachers. This is because students feel nearness to the teacher. [8]. Calling students by name is another way to interact effectively with students. It is sorry to say that most of the teachers take the names of the students by their dress color or by their physical appearance which hurts the feelings of the students so, they cannot be reliable to the teacher. Immediate Feedback is another way of effective communication. When students participate actively in the learning process, a teacher should encourage them with an appreciation or a reward. Thus the relationship between the teacher and student strengthens.

2.7. Innovative

The sources for conventional teaching were text books, notes, Chalk, black board etc... Now in student centered learning Technology became the main source. With the advent of Technology now information is at the door steps. Millennial learners adapted Technology as their learning source leaving a challenge to the traditional teachers. To pace with the innovative learners, teachers must give their willingness to work with Technology. We all understand that a traditional teacher may not get adjusted but even cannot always live in nostalgia. [7]. Teaching has undergone many changes, especially in using the sources from black board to cyclostyle, classes on air, overhead projectors, video tapes, photocopies, calculators, computers, portable computers, internet-world wide web, smart phones, simulations, tablets, Moocs and many more. Teachers have to set the stage for learning success by harnessing technology by making the learning come alive, showing real-world application, provide hands-on experience and give them a greater conceptual understanding. For this, knowledge of technology and willingness to work became a basic requirement for a teacher.

3. Desire to Excel

Of all the attributes this is the most important attribute. Unless a teacher takes the teaching profession with passion teaching-learning process cannot be effective. A teacher should have a vision that how he/she wants to see their students in future.[9]. This vision makes them to get ready for the innovative challenges and to be a creative person. Passionate teachers always question themselves when they get into the class like what am I going to teach today? What effective method I use to deliver the lecture? What students learn out of it? What is my objective and what is their outcome of the day? Do they justify the needs of teaching-learning process? The answers for these questions is the source of the self-evaluation of a teacher and completes the process of teaching for the day. Such a thought always makes a teacher active every day and learners enjoy the essence of learning.
4. Reflective Report
It is observed that most of the teachers did not possess all the attributes of an Engineering Educator. Some may not be empathetic, some may not be adaptable and most of the conventional teachers are not ready to work with the technology. It is the responsibility of the teachers to understand the need for the change and try to overcome their weakness by adapting / learning the new strategies of teaching-learning process. Self analysis will help any teacher to transform himself or herself into an eligible Engineering Educator. A teacher should always believe that " It is the teacher who makes the difference not the classroom ".

5. Conclusion
It cannot make a point if we rely upon only these attributes but there can be many which a teacher can make out of their experience and observation. With attributes a teacher can learn and know about their students' cultures and experiences, create a dynamic classrooms with different variety in teaching, assess the students learning through proper evaluation, note their errors and give timely feedback, record observations on a proper scale and motivate the students towards the path of life-long learning.

6. References
[1] Autar K K 2005 Seven habits of a highly effective engineering educator ASCE Journal of Professional Issues and Engineering Education 131(3) 175 – 77
[2] Chaubey A, Bhattacharya B and Shyamal K D M 2018 Attributes of good teaching in engineering education in Indian subcontinent 43(11) 0188
[3] Alok G, Saipriya P and Prabhanjan N 2020 Persuasive learning strategies for transforming engineering education Journal of Engineering Education Transformations 33(Special Issue) 402 – 07
[4] Husain Z and Kumar D 2014 Challenges for Holistic Engineering Education Development in India International Journal of Evaluation and Research in Education 3(1) 11–18
[5] Murray H 1991 Effective Teaching Behaviors in the College Classroom In: J C Smart (Ed) Higher Education: Handbook of Theory and Research 7 (New York: Agathon Press)
[6] Anuradha P 2019 The teaching learning process International Journal of Advanced Science and Technology 28 709–14
[7] Alok G, Pothupogu S, Reddy M S and SaiPriya P 2018 Trenchant Pathway to bring Innovation through Foundations to Product Design in Engineering Education IEEE 6th International Conference on MOOCs Innovation, and Technology in Education 43-47
[8] Kumar K S, Alok G, Reddy M S and Reddy N B S 2018 An integrated Multidisciplinary skill development strategy for effective execution from virtuality to reality in Engineering Education IEEE 6th International Conference on MOOCs Innovation and Technology in Education 79-83
[9] Santhosh D, Goverdhan C, Katayayani S, Shailaja S and Roopa G 2018 Impact of English Language Teaching in Technical Education Indian Journal of Public Health Research & Development 9(11)
[10] Shailaja S 2018 Enhanced Innovative Techniques of ELT International Journal of Pure and Applied Mathematics 120(6)