Motivation Based Engineering Education – A case study at RK University.

Chetankumar M. Patel[1], Dipesh M. Chauhan[2]

[1,2]Department of Mechanical Engineering, School of Engineering, RK University, Kasturbhadham, Rajkot(Guj.), India
[1]chetanpatel.mech@gmail.com
[2]dipesh.chauhan11@gmail.com

Abstract: Students who take admission in Engineering course are found to be capable, skilful and with infinite potentials. However, lack of motivation makes them dull. This paper discusses the cause of demotivation along with the symptoms. Solution to the problem is also discussed in form of a case study carried out at RK University.

Keywords: Motivation based teaching, ARCS model, Motivation based learning

1. Introduction

Motivation is a driving force for any human. When a person is full of motivation, he feels him/her on the top of the world. However, in the absence of the motivation, one feels paralysed and disabled even being capable.

Motivation has a major role in the practice of teaching-learning. Students need a continuous motivation along with their entire student life. So the students which are studying in Engineering are no exception.

Different authors have researched on motivation. Carole Ames have examined classroom learning environment in relation to achievement goal theory of motivation [1]. John M. Keller says "To stimulate students' motivation to learn can be made more predictable and manageable by considering four basic human characteristics and the motivational dynamics associated with them [2]. The author used ARCS model in his study. In the present paper, ARCS model classification is used. Debra K. Meyer and Julianne C. Turner in his article on Discovering Emotion in Classroom Motivation Research have discussed serendipitous findings that illustrated the importance of students' and teachers' emotions during instructional interactions [3]. Paul R. Pintrich in his article has shown Seven substantive questions are then suggested as important directions for current and future motivational science research efforts [4]. Ellen A. Skinner and Michael J. Belmont says "In contrast to psychological research, educational research has focused on the teacher behaviours that should be effective in promoting student motivation[5]. In their study, they found strong empirical support for the reciprocal relationship between teachers' behaviour and students' engagement in the classroom. Robert L. Williams & Susan L. Stockdale stated: " student motivation is a principal concern of teachers". In his article, they examined the difference between intrinsic and extrinsic motivation for academic learning [6].

Chetankumar M. Patel

Department of Mechanical Engineering, School of Engineering, RK University, Kasturbhadham, Rajkot(Guj.), India, chetanpatel.mech@gmail.com

Many authors have researched extensively on motivation based theories and practice. Most of the researchers have worked for subjective learning but there are very less who have worked to motivate the students for their behavioural change. This paper discusses the need of motivation for engineering education. It also addresses some of the techniques which are practised at RK University as a case study.

2. Need of Motivation

Students get admission in the course of Engineering after successful completion of their education up to standard 12. We can say that raw material (off course live) for Engineering course is from School. We know that when the row material is of lower quality, even when we have good processes, resources, technology – qualitative product can't be manufactured. This is true for education as well.

Students pass a minimum of 12 years of their life in school education. Due to improper teaching-learning practice during schools for an extended period of years, students get demotivated towards their overall growth and development. Many a time, school authorities pressurise the students to cram and remember their learning to get good marks in their exam. This way of learning is short but very destructive. Using brain continuously without understanding the stuff logically, adds up the heavy load on the delicate mind of a student. This is the major cause why a student becomes demotivated towards their future study. Solution for the improvement of school education is out of scope of this paper, but solution for making them motivated is theme of this paper

3. Symptoms for Unmotivated Students.

Following symptoms are found in an unmotivated student.

1. Unresponsive in laboratory and lectures.
2. Give priority for seating last
3. Don't ask questions.
4. Cannot set priorities in their life.
5. Remains confused and experiences many conflicts.
6. Cannot think critically and creatively.
7. Keeps distance with teachers.
8. Careless in their day to day life.
9. Experiences difficulty in self-study.
10. Often remains absent
11. Short tempered nature
12. Addictive for tobacco, alcohol etc.
13. Can't concentrate well in class as well as in preparation for the subject.
14. Stage fear
15. Poor presentation skill
16. Have no vision for goal setting
17. Immature behaviour
18. Poor decision making.
19. And much more…

4. Proposed Solution

Above symptoms can be cured if students are motivated during their teaching-learning process for the entire course of engineering. Students who take admission in Engineering are of age 14-15 years. At this age, students can easily discriminate about facts. If we motivate them, they can understand their abilities and goal.

Now, the question comes how one can motivate an Engineering student. John M. Keller has suggested four major categories and definitions in his research model of ARCS. It is Attention, Relevance, Confidence and Satisfaction. This has led to a case study as explained in the next section.

5. Case Study

One case study was carried out to motivate students according to ARCS model. As per ARCS model we categorised the symptoms in Attention, Relevance, Confidence and Satisfaction as shown in Table 1.

Table 1 : ARCS model Classification

Category	Symptoms
Attention	Unresponsive in laboratory and lectures Don't ask questions. Can't concentrate well in class as well as in preparation for the subject. Often remains absent Give priority for seating last
Relevance	Immature behaviour Addictive for tobacco, alcohol etc. Short tempered nature Have no vision for goal setting Experiences difficulty in self-study. Irresponsible towards their duty to parents, society and nation.
Confidence	Poor decision making. Stage fear Poor presentation skill Keeps distance with teachers Careless in their day to day life.
Satisfaction	Cannot set priorities in their life. Cannot think critically and creatively. Remains confused and experiences many conflicts.

6. Methodology

Teachers delivered talks on motivation during the laboratory/lecture hours except personnel counselling. No special time spent, but generally, first 10 minutes of lecture/lab were spent for the same. Sometimes it was done occasionally. Table 2 shows various methods of motivation which were used for this case study.

Table 2 : Methods of Motivation

Method	Description
Motivational stories	Various stories from ancient Indian scriptures, real life stories, etc.
Spiritual talks	Sharing of Indian Spiritual Practice from Global Perspective
Management talks	Various concepts of management.
Book Article Reading	Reading of some good article and discussion on it.
Newspaper Article reading	Some live events, inventions and current affairs happening in society and all around the world.
Ramayana	Discourses on Ramayana. Discussion of the various characters of Ramayana. Sundarkand is a story of Hanumanji searching for Sitaji(Goal setting exercise and facing challenges to achieve it.)
Indian Heritage	Discourses on Great Indian Heritage e.g. Ayurved, Scriptures, Great Rishimunis and masters, etc.
Videos	Motivational videos
Pictures	Motivational Pictures
Group Discussions	Exchange of ideas and discussion.
Mentoring	Guiding for some life learning lessons.
Personal Counselling	One to one counselling to solve problems on a personal basis.
Omkar	To control body and mind. Chanting Omkar every time before starting of laboratory or lecture.
Class Conduction	Students teach a small portion of

	study or a numerical in class.

It is found that when the session is started with Omkar and a small talk, great amount of receptivity and concentration is found amongst the students. This greatly helps them to teach the technical concepts.

7. Mapping with ARCS model

It is difficult to map exact parameter of ARCS model with the motivational method used above, as all the methods improve all four parameters more or less. Yet Table 3 shows the mapping of the motivational methods which has a major influence.

Table 3 : Mapping with ARCS model

Method	ARCS model Parameter
Motivational stories	Attention, Relevance, Confidence, Satisfaction
Spiritual talks	Confidence
Management talks	Confidence
Book Article Reading	Relevance
Newspaper Article reading	Relevance
Ramayana	Attention, Relevance, Confidence, Satisfaction
Indian Heritage	Confidence
Videos	Attention, Relevance, Confidence, Satisfaction
Pictures	Attention, Relevance, Confidence, Satisfaction
Group Discussions	Attention
Mentoring	Attention
Personal Counselling	Attention, Relevance, Confidence, Satisfaction
Omkar	Satisfaction, Relevance
Class Conduction	Confidence

8. Survey

Above practice was implemented continuously for one year. After one year, a survey was carried out amongst the students containing questionaries. Students were asked questions as shown below. They need to rate it on a scale of 0 to 10. 0 being not agreed and 10 strongly agreeing. This survey was conducted using Google Forms.

I. Attention
   1. My responsiveness in the laboratory and lectures has increased. (Responsiveness)
   2. Now I ask and communicate more with the teachers during and after the lab/lectures
   3. My ability to stay focused on a particular thing for a longer period has increased? (Concentration)
   4. My engagement and presence with lab/lectures have increased. (Presence)
   5. I occupy the seat from the front and not from the last.

II. Relevance
   6. My level of maturity has now increased.
   7. My addictive habits (smoking, tobacco, alcohol etc.) are now gone down. (0 being no addiction)
   8. There is an improvement in my short tempered nature or My level of patience has increased.
   9. My future vision has increased. I am able to set and identify my goals.
   10. My self-learning ability is increased.
   11. My respect and responsibility towards my parents, society and Nation have increased.
   12. My decision-making ability has increased.

III. Confidence
   13. My stage fear has reduced
   14. My presentation skill has now increased
   15. I am now more comfortable to share my thoughts or to talk with my teachers. (Distance with teachers has decreased.)
   16. My carelessness in the day to day life has decreased.

IV. Satisfaction
   17. My ability to set priorities of work has increased. (Time Management)
   18. My ability to think critically and creatively has increased.
   19. Confusion and conflicts in my life have decreased.
   20. Chanting OMKAR before starting of lab/lecture has helped me.
   21. I chant OMKAR at my home also.

9. Survey Result

50 students taken participation in the survey. Table 4 shows the result of a survey in tabular form. Each row represents sequence number of survey question and column represents their ratings. The cell gives the frequency of the occurrences for a particular rating.

Table 4 : Survey Result Summary

Survey Question	Ratings from 0 to 10										
	0	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
1	1	0	0	0	4	3	4	8	17	6	7
2	1	1	0	0	3	3	4	6	12	14	6
3	1	0	1	2	0	5	6	7	11	11	6
4	1	0	0	0	2	2	5	9	12	7	12
5	3	2	0	2	3	4	1	7	5	10	13
6	0	0	0	1	3	4	2	4	12	10	15
7	19	1	0	0	2	2	2	1	2	3	18
8	1	0	0	0	4	4	5	6	11	8	11
9	1	0	1	1	2	2	3	6	12	8	14
10	1	0	0	0	4	0	5	4	9	13	14
11	0	0	0	0	2	0	1	5	9	13	20
12	0	0	0	0	2	0	4	7	16	9	12
13	4	0	0	0	1	3	4	9	11	9	9
14	2	0	1	0	0	4	4	8	11	14	6
15	2	0	0	2	0	4	3	4	11	11	13
16	4	0	0	1	1	6	2	7	9	12	8

17	1	0	0	1	2	2	6	11	11	8	8
18	0	0	0	0	1	3	3	7	12	15	9
19	1	1	0	2	2	8	3	6	14	7	6
20	0	3	0	0	0	2	2	1	7	12	23

From Table 4, it can be seen that there is less number of 0. And more number of occurrences are towards the higher rank. This shows that students find greater improvement.

Starting a session with OMKAR recitation helps to create very positive environment. The place is fealt quite pieceful. Even it helps the teacher to concentrate for the teaching. Stduents were encouraged to start their day with OMKAR. When asked the students about "Do you chant OMKAR at your home ?", following result is found.

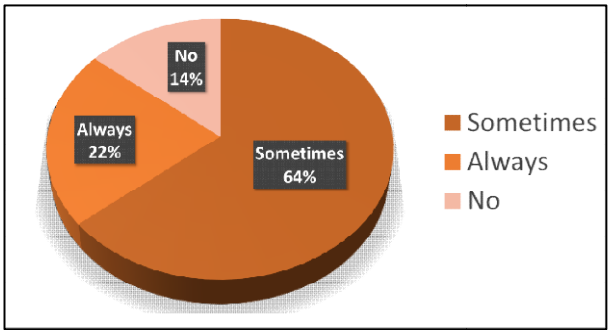

Fig. 1 : PIE chart for OMKAR

The result of Omkar is very significant. As shown in fig. 1, 64 % students chant Omkar at their home often and 14 % students do it on daily basis.

10. Conclusions

Motivation based teaching makes the teaching-learning process very smooth. Students learn without stress. As teaching is a process of bringing out latent potential of a student, motivation does the same thing but quite fast. Students vision of dealing with the world changes a lot.

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