

# COMPUTER AIDED TEACHING OF INDUSTRIAL MANAGEMENT SUBJECT - A CASE STUDY

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## Abstract

*Utilization of Computers and Overhead Projector (OHP) as a tool for teaching and learning experimentation has increased significantly in recent years, as computers have become more powerful and less expensive. Teachers can experiment on using alternative models of Teaching – Learning methods easily and effectively.*

*But can the computers and OHP replace the traditional method of teaching by chalk and duster and do these tools really improve the students learning? Also does the application of computer as a teaching media makes the Teaching- Learning process more effective and does it reduces the learning losses?*

*Here in we describe the results of the experiments conducted at K.K.Wagh Institute of Engineering Education & Research, Nashik (formerly known as K.K.Wagh College of Engineering) while teaching the Industrial Management subject for III<sup>rd</sup> semester Production Engineering students four years between 2001-2004.*

*The experiments were designed to understand if learning of Industrial Management subject was significantly affected by three treatments of teaching medias namely 1. Chalk and duster 2. OHP 3. Computer aided teaching.*

*This paper focuses on the development of Computer Aided Teaching Tool (CATT) and also conclusions of the experiments.*

## 1.0 Introduction:

Institutions imparting technical education contribute significantly to the economical and technological development of society. With changing technological horizons, considerable shift is taking place in the application of teaching medias in the educational institutes [1]. It is well known that in an educational system greater

amount of learning takes place in the classroom. The measure of quality in the classroom teaching is how much the students learn [2]. In order to improve the quality of teaching – learning process the teachers of the technical institutes are facing new challenges in the application of Information Technology (IT) and Computer as a teaching media in the classroom.

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Teachers can experiment on using alternative models of Teaching – Learning situations by using the traditional methods of teaching with the help of chalk and duster and also by using the computer and there by selecting the good method for teaching.

### 1.1 Background

In the recent past, with the integration of computer and communication technology, continuous decrease in the price of computers along with explosion of World –Wide- Web, the application of computer as a teaching tool has increased significantly in the teaching and learning process [3].

These developments have provided an opportunity for teachers to expand and perhaps replace traditional practices of teaching and learning methods. The significant benefit of Computer Assisted Instruction is due to its cost effectiveness and along with availability of powerful computers and proliferation of software platforms for developing the teaching models.

However the question is does the computers effectively replace the classroom instructions by using the chalk and duster and does it improve the learning process? Further, to what degree and to what extent the computer is effective in teaching the students of engineering college is an important question to address.

This paper focuses on the development of Computer Aided Teaching Tools (CATT) and also conclusions from the feedback taken from the students and final marks obtained by students for the Industrial Management subject to assess the students learning in the different treatments.

## 2.0 Experimental Framework:

Herein we describe the methodology followed to design the Computer Aided Teaching Tool for teaching the Industrial Management subject at K.K.Wagh Institute of Engineering Education & Research-Nashik and also the various treatments for effective teaching experiment.

### 2.1 About the course

Industrial Management is subject for students at second year second semester of the Production Engineering program. The objective of the course is to introduce the concept and principles of Industrial Management to students. Along with that it also develops in the students higher order of cognitive skills, cooperative skills, leadership qualities, communication skills, motivation and management techniques.

This course is having following modules in the syllabus.

- 1.Organisation
- 2.Management
- 3.Communication and Body language
4. Human Needs
- 5.Motivation Theories
- 6.Theories of Leadership
- 7.Costing and Cost Control
8. Economics
- 9.Human Resource Development

**Table1:Modules of Industrial Management**

Course work consists of four contact hours per week and theory exam of 100 marks conducted by University of Pune.

### 2.2 Objective of Study

- I. To assess the effect of different teaching medias on the Teaching – Learning process for Industrial Management subject.
- II. To find out if there is any relation between performances of the students in university examination when the teaching medias are changed.

### 2.3 Methodology of Experiment

The students of the Industrial Management classes were taught with the chalk and duster in the year 2001, with the OHP in the year 2003 and with the help of computer aided teaching tool developed in-house for the subject in 2004. The teaching tool experiments had same instructor, same classroom but different students. Table 2 and 3 below summarizes the details of the experiment.

Academic Year	Teaching Methodology	Methodology code
2000-2001	Chalk and Board	A
2001-2002	Chalk and Board + Transparencies	B
2002-2003	Transparencies+ Computer Aided Teaching	C
2003-2004	Computer Aided Teaching	D

**Table 2 :** Teaching Methodology

Experiment constants	Experiment variables
Teacher	Media of teaching
Classroom	Students
Textbooks Course Material, Reference Books and Notes	Question paper

**Table3** Experiment constant and variables

### 2.4 Evaluation Methodology

To know the best teaching media for teaching the Industrial Management subject, the university results are compared and also the feedback and brainstorming sessions were conducted with the

students at the end of the each course.

### 3.0 Teaching by Chalk and Board:

Industrial management is a subject involving concepts and practices of management and leadership skills. Teaching of this subject requires eye contact and full attention from students. In the academic year 2000-2001 teacher used the Chalk and board method for teaching the course. At the end of the course the teacher conducted a brainstorming session with students to know the feedback about teaching media. The aim was to know the effectiveness of this media and improvements needed. It was observed from the discussion that the problem with the lecturing is that student's attention to teachers' instructions decreases as the lecture proceeds.

#### 3.1 Conclusions from the brainstorming session

Knowledge is constructed, discovered, transformed and extended by the faculty. The assumption while teaching was that the students mind is like an empty vessel waiting for teacher to pour the knowledge. At the end of the course a brainstorming session was held in which 33 students have participated. The group consisted of first five toppers, four female students and twenty-nine male students. The conclusions are as below.

1. Poor eye contact because teacher was facing the board for more than 40% during the lectures for writing or drawing the charts.
2. Sufficient time was not available to cover the entire syllabus and also to explain the topics with the examples and management stories. Hence the time was just sufficient enough to share the lower level of information.
3. Poor attention of the students to the teaching-learning process

4. More learning losses or transmission losses.
5. One-way communication, giving little scope for Student-Faculty interaction in the class.
6. Three dimensional charts, figures and pictures are almost impossible to be drawn in the class in the limited available time.

It is observed further from the discussion and also by many of the researchers that 10% of the audience displays signs of inattention after fifteen minutes. And a casual check of twenty-four hours revealed that the audience recalled significant details and these were generally wrong. [4]

But the question is does the computer as a teaching tool improves the above mentioned limitations.

#### **4.0 Design of the Computer Aided Teaching Tool:**

If computer is to be used as tool for teaching, the development of in-house Computer assisted Teaching Tool by faculty and with the help of students will definitely reduce the cost and also provide an opportunity to freely incorporate the changes that are required for teaching a particular subject. In-house development also leads to active involvement of the students in the teaching and learning process. Here in we describe the in-house development of Computer Aided Teaching Tool.

##### **4.1 Procedure adopted for preparing the Computer Aided Teaching Tool**

1. Analyze the subject to be taught and identify its component in terms of principles, concepts, procedures, applications and problem solving tasks.
2. Preparation of notes
3. Preparation of Transparencies for the Over

Head Projector

4. Preparation of power point presentations for the various modules
5. Integrating those PPT
6. Designing the web page
7. Identifying appropriate exercises for each topic
8. Updating regularly with recent information.

Flow chart 1 summarizes the procedure adopted for developing the Computer aided teaching tool.

##### **4.2 Over all Design**

The front page of the Web site is as shown in the Appendix -I. From the front page several different links can be reached. These includes objective of the course, various IM modules and Exercises. The links about the various IM modules such as Management, Communication, Leadership, Human Needs etc. will take the user to a new page with the title and a picture of the respective module. The course materials of the classroom are broken into various power point slides for example: definition of communication, process of communication, communication medias, body languages etc. These slides can be selected to view the full screen for teaching in the class.

The on-line exercises are also included. The student can select the answers from the objective type questions to know what type of leader he is or what are his needs. The home page brings the entire teaching module of the course

##### **5.0 Analysis of University Results:**

The University of Pune conducts an examination of 100 marks at the end of semester. The marks obtained by students in last four years were compared as shown in the Table 4 and average and standard deviations are calculated to know the effect of teaching medias on the

Method code	No. of Stud. Appeared	No. of Stud.	Max. Marks	Avg. Marks	Std. Deviation	Sr.No	Feature	Chalk and Duster	Computer aided Teaching tool
A	61	52	59	41.26	11.23	04	Curiosity about what next in the teaching?	More	Less
B	60	56	57	43.1	9.36	05	Accuracy and understanding the concept and figure	Less	Better
C	64	58	58	42.54	9.36	06	Accuracy of taking notes	Less	More
D	60	55	50	40.81	5.81	07	Teacher error	More	Less

marks obtained by students.

**Table 4: University Marks**

It can be seen from the above table that the average marks obtained by students is almost same with the three different teaching methodologies. However, the standard deviation of the marks obtained by students has reduced considerably when computer aided teaching method was adopted. The student's feed back was also taken at the end of Semester 2004. The students have appreciated the computer-aided teaching, as it was more interesting and easier to understand the concept. This could be the possible reason for significant reduction in standard deviation of marks.

**5.1 Comparison of Teaching media**

At the end of 2004 course, brainstorming session was held in which thirty students have participated. The group was consisting of first five toppers, three female students and twenty-seven male students. The conclusions of the

08	Presentation of the content	Depends on the teacher's ability	Best
09	Attentiveness to the teachers	Better	Better than other media
10	Flexibility of teaching	At any time in the class	Availability of LCD and Power
11	For teaching derivations and numericals	Recommended	Not
12	Content of learning in 55 minutes	Less	More

brainstorming sessions and comparisons of the two teaching medias are as below.

Sr.No	Feature	Chalk and Duster	Computer aided Teaching tool
01	Eye contact between teacher-student	Poor (as teacher faces 40% time towards board)	Improves
02	Student-Teacher Interaction	Better	Better than other medias
03	Grasping concept	Good	Better than other medias

**6.0 CONCLUSIONS**

- I. Computer as teaching media improves the interest of students in the classroom and it makes the learning interesting and also reduces the learning time.
- II. However, from the analysis of University results it can be concluded that application of computer, as a teaching media does not influence the marks obtained by students.
- III. It is not advisable to use computer where

the student has to learn the knowledge step by step for example while teaching mathematical derivations.

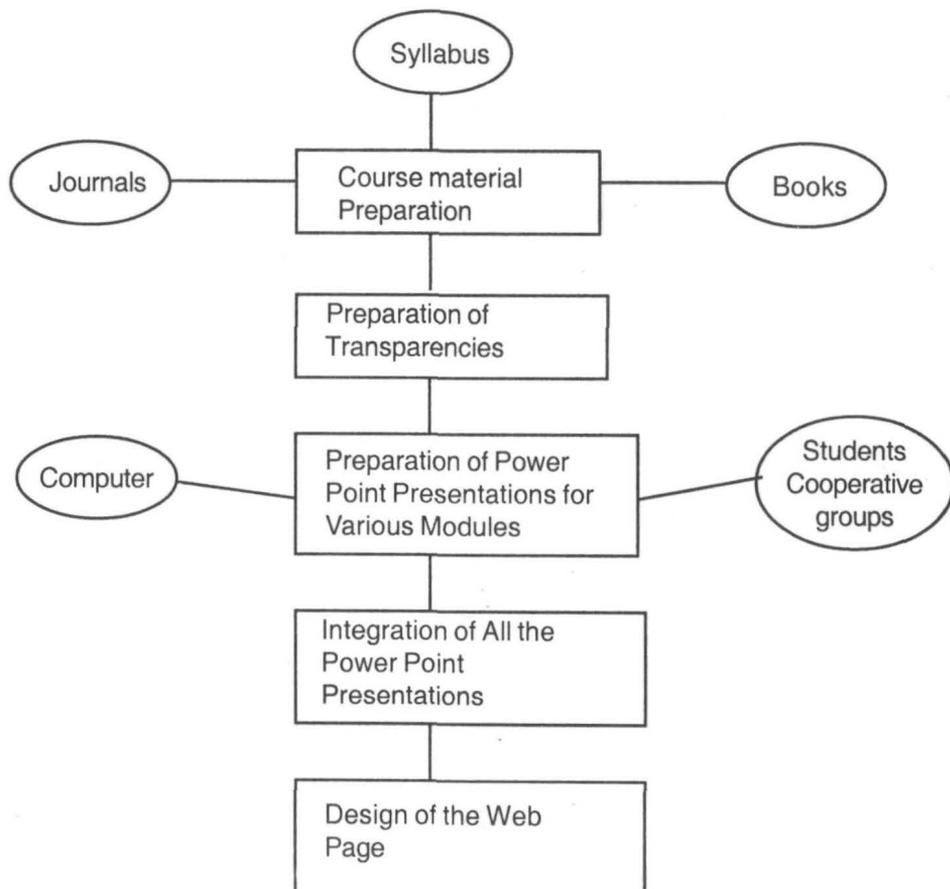
- IV. Computer as a teaching tool will not replace the traditional method of teaching by chalk and board.

One system is not a replacement of the other. The teachers can play a vital role in bringing in a change by experimenting on using alternative Models of Teaching and Learning process.

### References:

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3. William G. Sullivan, Jains P. Terrpenny and Harpreet Singh, "A virtual classroom experiment for teaching Engineering Economy" The Engineering Economist, Vol.49 No.4, 2005 pp. 279-304
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**Flow Chart 1 : Development of Computer Aided Teaching Tool**



## Appendix-I

K. K. Wagh Institute of Engineering Education & Research - Nashik

### COMPUTER AIDED TEACHING TOOL

#### INDUSTRIAL MANAGEMENT

##### Objective of the Course

##### **Prepared By**

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##### **Modules of Course**

Organization

Human Needs

Management

Motivational Theories

Committees

Group Dynamics

Communication

Leadership

Motivation

HRD

Recruitment

##### Experimental Exercises

