Effective Teaching methodologies for teaching Digital controller subject

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Abstract: The digital controllers are gaining a significant part in an extensive variety of designing applications. Chip courses are at present educated by all building branches of all existing colleges on the planet. The traditional strategy for educating such courses to a great extent is in view of hypothesis and having lab course. Practice and application-situated methodology in training is essential, and some do research on active learning and cooperative problem-solving. It have shown that a student will learn faster and develop better communication skills, leadership qualities and team work ambience through these methods. In this paper, another methodology is proposed for the educating of digital controller courses. This new approach empowers students to take in the down to earth utilization of digital controllers from a functional perspective.

Keywords: Chart Based Learning, Individualized Method of Learning, Google Blogger, Teaching Methodologies

1. Introduction

Introduction (chart based learning, learning through MP & MC kits, quiz/GD, group assignments). Microcontroller subject is one of the mandatory subject for Electrical and Electronics Engineering students [1]. Customarily, this course was shown centring essential on PC programming and equipment design [2]. Be that as it goes, the headway in semiconductor gadgets these days changed the way business tackles assembling and process control issues. Numerous control issues can now be settled by all the more viably and dependably utilizing progressed advanced controllers instead of utilizing mechanical or electrical exchanging frameworks. The expanded utilization of the microcontroller in enterprises prompted new patterns in digital controller teaching [2].

In real human beings can recall data only once he/she has experienced on their own by hands-on. It is hard to retrieve the data learned or to remember the content given by the instructor in the classroom through conventional teaching. The percentage of data retrieval after 24 hours of the teaching has been processed in three categories i.e., verbal processing, Verbal and Visual processing, and Observe and doing. Among the three methodologies, third method is best to retrieve the data from human. And the percentage of the data retention after 24 hours is given in the fig. 1.

There are two teaching techniques in showing this subject which is the conventional methodology and option approach [3]. The conventional teaching technique underscores direct guideline and address, seatwork and the student learn through listening and perception. In the department of Electrical and Electronics Engineering in Shri Vishnu Engineering College for Women (SVECW), digital controller subject is educated as an address in a classroom or address in seminar hall, for a time of three to four months. Amid the semester, students were shown speculations about the inward Engineering of the digital controller and how to utilize the advanced controller through programming with a test system in laboratory sessions in the same semester or next semester. Towards the end of the course, students might be offered assignments to compose on the information they have obtained all through the semester. Be that as it may, because of time imperative and the absence of hands-on practice in class, students experienced issues in presenting the assignments on outline based inquiries.

The alternative teaching methods emphasized on Individualized Method of Learning (IML), Interactive Method of Teaching (IMT), Chart Based Learning (CBL), group assignments, and demonstrating through digital controller Kits available in Lab. Learning MP and MC or digital controller courses with real-world applications provides the opportunity of tackling problems which would not be normally encountered in traditional learning [2]. The hands-on approach of teaching in Engineering curriculum must be exposed to undergraduate students [4]. Several academicians also have proposed new method to teach microcontroller subject [5,2]. IML method helps the
student to work or learn on her own and sharing the experiences in the next class. IMT method of learning helps the students to interact with faculty through question and answers session. The alternative teaching methods emphasized on Chart Based Learning (CBL), hands-on practices and creating the own web portal through google blogger.

Learning digital controller courses with real-world applications provide the opportunity of tackling problems which would not be normally encountered in traditional learning. The hands-on approach of teaching in engineering curriculum must be exposed to undergraduate students [4]. In SVECW, mainly CBL and Google blogger approaches are selected to complement the classic form of teaching. The level of difficulty ranges from elementary to intermediate tasks such as seven segment display to motor control are discussed in hands on practices of the subject. The course had been conducted many times and had been improved over the time. The response of teaching approaches is evaluated through results and investigates the effectiveness of the course.

2. Teaching Methodologies
2.1 Chart based learning (CBL): In this teaching methodology students are partitioned into groups and a one of a kind errand (unique task) is being dispensed to individual group. Students deal with the errand in gathering, share their thoughts, and set up the chart to display their idea in class before the other group and faculty. Faculty will screen the groups any place they require help. Fig. 2 and Fig. 3, shows the students participating in the chart based learning.

![Fig 2. Students discussing in preparation of charts](image1)

![Fig 3. Students presenting the charts.](image2)

2.2 Individualized Method of Learning (IML): Student works at his own particular pace. Student is effectively required in performing particular learning assignments, and encounters accomplishment in learning. Individual student is assigned a individual problem in the digital controller subject and student work on his/her own and the problem solving approach is discussed with faculty [8].

2.3 Google Blogger: This is the application available in google. With the help of this application, students develop their own site based on the tasks or discussions made in
the classroom and the completed tasks given by the faculty. Students also upload their assignments in the blogger and faculty can evaluate the assignments in online.

This will help students not to copy from one another. Recent days everyone is passionate with smart mobiles, this blogger help the students to view their blogs at any time and they can prepare for examinations also.

Apart from the above methods students are trained in designing the applications using digital controller kits, in view of that faculty will familiarise the students about architecture, addressing modes, instruction sets, interrupts and data communication of the digital controller. There are hundreds of controller devices from different digital controller families in the market, manufactured by different manufacturing companies. The architecture and assembly language instructions of these controllers are usually all different. Students who learn the details of one controller architecture may find it difficult to use another controller when encountered in industry or in academic project or in hobby project. Thus, it will be useful to teach the very basic architecture of as many controllers as possible to make students familiar with such different architectures.

At last selected controller kit may be used for testing the developed code and run the application. In the curriculum of SVECW the students get familiar with 8086, 80286, 80386, 8051, 8255, 8259, 8257 etc., and students can able to do stepper motor interfacing, A/D conversion, D/A conversion, Relays, Latch connections, Keyboard, seven segment display interfacing. After completion of the digital controller course students are very much familiar with programming, architecture and pin-configuration and students are able to carry out hardware projects in various labs in SVECW like Assistive Technology Lab(ATL), Power and Energy Center (PEC), Research Lab in Electrical and Electronics Engineering (EEE) department.

3. Benefits of the Various Teaching Methodologies

Our methodology for instructing microcontroller courses opens up an extensive variety of chances for presenting students to connected designing issues also, to the novel arrangements that microcontrollers offer in managing these issues. The following are instructive
advantages which would come about because of the different teaching methodologies. Students in designing educational module are continually scanning for answers to the inquiry ‘what does a specialist do in this present reality?’ Often it is just in their senior year that they get an impression of the answer through a senior outline experience. Before the senior year, most building courses are to a great extent building science with some introduction to building outline. Our methodology would permit for a prior presentation to building the outline identified with observing and control. Some advantages of the methodologies are

- Inspiring the students for later classes;
- Widening their points of view;
- Improving their openings for Job.
- Increasing Confidence level

4. Discussion and Benefits

The feedback got from students has been positive and empowering. Numerous asserted that they have the better comprehension of the digital controller after the using different teaching methodologies. From the survey, it was found that grouping the students had a positive effect in learning. Most of the students liked to work in groups and from perception amid the course, students who were assigned individual tasks or assignments likewise decided to talk about with other student friends and discuss each other to finish their assignments. For fast learning students, they delighted in working exclusively as they could work faster, and could endeavor more confounded assignments in light of their enthusiasm, with help from the teacher or instructor. To make the subject more effective and interactive to all students, the teacher must know about student skills and should identify the fast learning and slow learning students. Set up extra assignments with a higher difficulty level for fast learning students who finished their assignments early. For slow learning students, the assignment level should be minimized and the teacher should observe more frequently.

While the subject information bestowed by hands-on methodology ought to be similar to that of the traditional lecture-based educational programs, the hands-on methodology varied in two essential ways:

1. Students should effectively take part in their own particular instruction, with the accentuation being on learning.

2. Member’s prompt hands-on practice that takes after a theoretical lecture will give sensible representation to that new information and urge them to end up self-directed learners.

3. Students can design their own circuits with digital controller kits.

After effectively introducing various teaching methodologies in digital controller students to sixth semester students of 2015-16 the results are compared with previous batch 2014-15 students and the results are found effectively high and results graph is given in fig. 7.

Fig. 7  Semester result analysis after and before introducing teaching methodologies

5. Conclusion

This paper has proposed and depicts another way to deal with showing digital controller based courses to undergraduate and postgraduate students at colleges and specialized schools. The proposed teaching methodologies depends on utilizing the digital controller as an outline device to take care of designing issues as opposed to investing the significant measure of energy to educate the theory and low-level computing construct programming of these gadgets

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