

Incorporating latest technologies in Engineering Education - iMac Lab

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Abstract—Technology is recurrently interspersed into educational programs and practice to aid learning for students irrespective of domains across all educational institutes. As discrete features are offered within dominant products, students are progressively able to connect with classroom technologies and teachers are also able to customise the course contents for varying students' preferences. Atharva college of Engineering at Mumbai is committed to the mission of creating awareness among students about the importance of keeping themselves updated about latest technologies in various avenues. The college constantly aspires to provide extensive technological education to get acquainted to the rapid proliferation in technology. The college has tried many innovative projects to improve teaching –learning process and develop curiosity in the mind of students. Some of the projects are Satellite Ground station, IEDC (Indian Engineering Deans Council), IUCEE –SPEED (Indo US Collaboration for Engineering Education- Student Platform for Engineering Education Development), Techithon, IEEE, CSI, Paradigm of Life, etc. As a part of these innovation trend, our college has set-up a state-of-the art iMac Lab consisting of 20 iMacs, an iPad and an Apple TV. Various orientations were conducted for the faculty members and students to

create awareness on the importance of being practically updated about latest technologies. Workshops were also conducted on various trending topics. An opinion survey was conducted with the sample of students and has been included in the paper with statistical analysis.

Keywords—Engineering education, innovation, Atharva engineering college, teaching, learning, iMac Lab

1. Introduction

Traditional methods in engineering education are proving to be less productive among students for being competitive in global market. Recent research on the topic specifies about what should be changed in education system and very few addressed the problem of how to do the same. As an impact of this, steps are taken in many colleges to achieve new standards in teaching and learning. It is observed that more emphasis is laid on infrastructural support for curriculum development and less on pedagogy of engineering education. To enhance the learning of the students, they must be provided with necessary infrastructure, technological advantage and above all the awareness on the importance of keeping abreast with technological trends which in turn will empower them to become leaders of engineering discovery, innovation and learning.

As we are living in a world dominated by technology, we need to discern what will be beneficial for the students among all technologies and provide

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necessary orientation, awareness and training to make them skilled in the field.

The Mac operating system is known for its astounding features, distinctive style, versatility, higher security and their excellent durability. Technical forecasts estimate that in a decade or two, most of the OS market share will be held by Mac. Foreseeing the change to come, Atharva college of Engineering has established an iMac Lab which consists of 20 iMacs, an iPad and an Apple TV.

Our paper also presents a literature survey on the topic. We also present the details of the orientations and workshops conducted in the lab which was followed by an opinion survey from a sample set of students on the impact of this lab and the sessions conducted.

2. Literature Survey

Deepali Maste [1] in her paper emphasised the importance of spawning cognisance in students about the importance of innovations, keeping up to date with technologies awareness among students and giving them opportunities to keep abreast of the latest technologies in various domains. Results of an opinion survey with sample of students about sense of satisfaction was carried out and presented in the paper with statistical analysis[1].

Alan Finkel[2] states the vitality of creativity and innovation in his work that specifies that incorporating project-based learning and including innovations will result in an increasing understanding and application of the concepts. Cutting edge laboratories and internet based course material are increasingly proving to be beneficial not just in confined courses but in research and development as well[2].

Deborah N. Huntzinger [3] presents the need of immediate change on the approach towards engineering education which is mostly confined to completing curriculum in traditional methods. Further the author emphasises that mere knowledge base is not sufficient for them to come up with appropriate solutions. They require adequate guidance that will lead them to intellectual development and they also need to understand the effect of their resolves. For the environment to be learner-centric, it is proved that the importance given to practicals, hands-on sessions and

projects pays off more than the conventional approaches [3].

Graham. R's international study [4] on how the engineering education needs to be transfigured, and his further assertion on achieving change, has wide relevance. The perpetual challenge for most engineering education setups is to refrain from adding more material into the degree programs, and rather give importance on giving the range of feasible graduate outcomes. Incorporating technology into the existing system and giving more importance to practicals and hands-on sessions will help students to expand their thought horizons to come up with creative engineering solutions [4]

The purpose of the study done by Cristina[5] in her was to understand the notions of engineering students on engineering education. The results showed that students strongly insisted the significance of their own place in the engineering educational system. It further stated the value of instructional technology and real work examples in boosting the quality of engineering education.

3. Objective

The main aim for this research is to adjudge the impact of including extra-curricular activity in terms

ACTIVITY REPORT OF DIAC LAB FROM 09-12-2015 TO 18-02-2015

DATE	TOPIC	DESCRIPTION
9/2/2015	Introduction of Mac OSX	Discussions on how Mac is different from a Windows or Linux OS, how it is easy to use and how it works. We were shown why Mac does not get viruses we security on Mac.
10/2/2015	Experimenting with Airdrop	Airdrop function which is used to transfer files between computers wirelessly on the network was discussed and used. Experimentation was also done to check if
11/2/2015	Presentations and Live Demo Time Machine	Discussion on how the Backup software on Mac works. Backup was experimented and recovered lost files, and experimented with network backup with Mac.
12/2/2015	Presentation on iBook and Book Author	A detailed presentation on iBook reader, iBooks and book authoring book for Mac, iBook Author. Explanation on how to create a book and publish one to the store
13/2/2015	Experimenting with Screen Sharing and Remote Login	using Mac from Ubuntu, Android and Windows devices using VNC and SplashTop.
16/2/2015	Creation of iCloud account	iCloud accounts were created and linked to each Mac. iMessage and iTunes accounts linked to three iCloud accounts were used iBook Author application on a iMac was
17/2/2015	Exploring Keynote, Pages, Numbers	Explored iWork suite to Keynote, Pages and Numbers, which are the Mac equivalents of Presentation, Word and Excel. They were found to be powerful collaboration tools as
18/2/2015	Development of Basic App	Hello World and Calculator Apps using Swift programming Languages and testing on iBook Author

Figure 1. A Snapshot Of Daily Activity Report At Atharva iMac Lab

of cutting-edge technology as part of the engineering education to gear them up in updating themselves with the fast progress of technologies.

4. Orientation And Workshops

4.1 Orientations

In December, 2014, an orientation session on Mac OS was given to a group of 20 faculty members of various departments of Atharva College of Engineering by an apple authorised trainer. On the first day there was a discussion on how Mac ousts Windows in terms of performance, security, versatility and GUI. There were few presentations on the working of Mac OS X. On the second day, there was a briefing of many popular apps and features of Mac like iBook author, iTunes U, GarageBand, Time Machine, Magic Mouse etc. The orientation winded up on a positive note with the teachers encouraged to take further steps in learning the OS to use it for teaching-learning methods as well.

In February, 2015 as an initial phase, 20 students were selected from the Department of Computer Engineering and IT to be the student coordinators of iMac Lab. A 2-day orientation was given to these students. Students were trained to work with the Mac OS and various sessions were conducted to brief them on various apps and features of Mac.

The sessions covered the following topics:

- Introduction to Mac
- Details of iMac Lab
- Why Mac? How is it better than windows?
- Hands-on on MAC
- Overview of Apps
- Briefing of few apps / features
- Hands-on on apps
- Overview of iOS.

A regular timetable has been set for the iMac Lab where 2 hours a day is allotted for the students enrolled to come over and work on iMac. The topics to be covered during these hours are broadly classified into Study of Mac OS X, File sharing, Networking, Apps in Mac, Mobile App development etc.,

4.2. Workshops

Taking into account the latest developments and

the explosion of the field of mobile application development, Atharva College of Engineering in collaboration with Academic Interface Program(AIP) team, TCS, Mumbai, organised a 5- day workshop on Swift programming (the coding language used for developing applications in iOS) and iOS App Development in March, 2015 at iMac Lab, Atharva college of Engineering.

The sessions started with basics of SWIFT language and on each day, the complexity of problems and the kind of applications were augmented. All the five days involved theory as well practical sessions and more importance was given to hands-on sessions.

On the last two days, students were divided into groups and were assigned tasks. One interesting task was to develop a mobile version (iOS version) of the website of Atharva College of Engineering, a feat the students almost completed except for few curbs because of their lack of expertise in the field.

In order to keep them fresh with the knowledge of the workshop, assignments were given to them which they are supposed to complete as a day-by-day task for 15 days after the workshop. These assignments are meant to gear up their learning, foster their creativity and aid them in developing new apps in less time. The assignments are designed to their level of knowledge they obtained in the five days of training.

On the final day of workshop, the workshop was concluded on a positive note where the trainers shared the feedback of the students being privileged to have such a platform to develop and showcase their capabilities.

The feedback of the students was also extremely positive. They were enthusiastic about being granted such a great opportunity of getting this vast amount of knowledge and learning from experts in industry literally at no cost.

5. Results of Statistical Analysis

5.1 Faculty Orientation

The faculty members who attended the orientation represented various departments of the college. Though the satisfaction

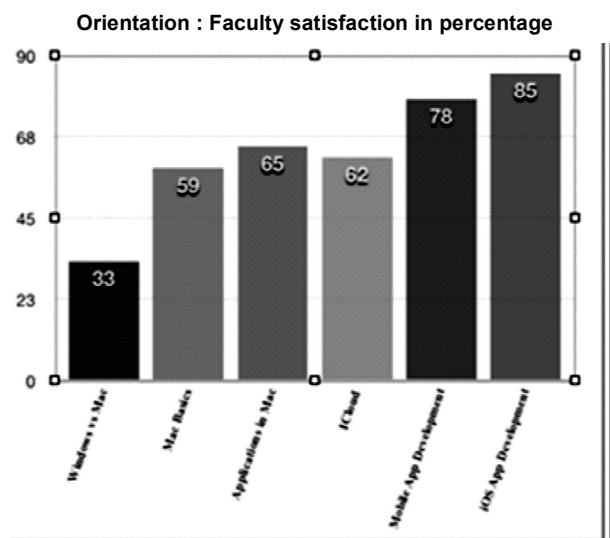
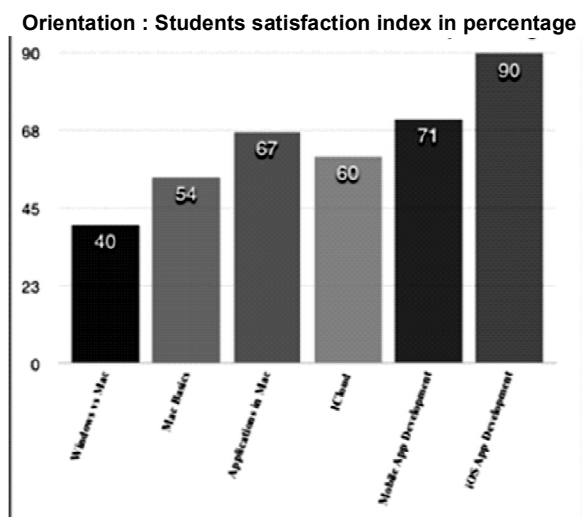


Figure 2. Orientation: Faculty satisfaction on various topics (in Percentage)

percentage is subjective to their knowledge of the OS, the general feedback was positive. As seen in the result, an opinion survey was conducted, which showed increasing interest in the topics covered during the sessions.

5.2 Student Orientation

As a next phase, the faculty members who were trained during the orientation gave orientation sessions to the students in batches. The results were collected on daily basis during the orientation each day as opinion surveys. From the results we can see that the students' enthusiasm towards the sessions was increasing every day. Since it was more about the practical sessions and hands-on, the students found it to be more beneficial.



Orientation: Students' satisfaction on various topics (in Percentage)

They were amazed by the applications of Mac like iBook Author, the resources in iTunes-U, the power packed iWork (Pages, numbers and keynote) and the response for that session was very positive.

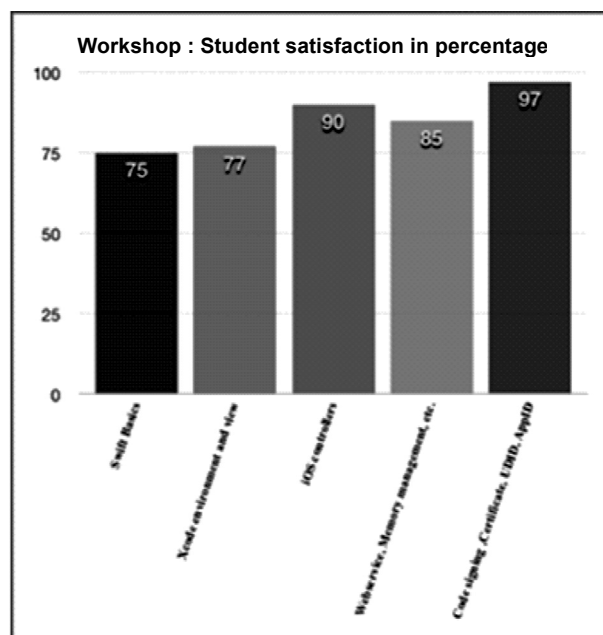


Figure 4. Workshop: Students' satisfaction on various topics (in Percentage)

Once the orientation was complete, feedback was taken from a sample of students on the topics of their interest. Mobile App development got an overwhelming response from the students as well as faculties which prompted us to conduct a session on the iOS App development by industry experts.

The results shown above presents the feedback of the participants on various topics covered during the workshop. The overall satisfaction percentage was above average. Especially on the final two days, when the core topics like localisation, web parsing, memory management, code signing, certification were explained, the interest in the domain augmented among the participants.

6. Discussion

The lab opened up a whole new world of opportunities for most of the students in our institution. It proved to be highly beneficial for the engineering students irrespective of departments. They are getting more and more updated each day and come forward specifying their further interest in many other fields like, networking, web services etc. thus

helping them decide on their career path at an early stage.

Mac's popularity in the field of media is well-known. Spectacular applications are present in Mac which will cater the needs of management, fashion technology students, physics, chemistry, mathematics and biology students as well.

7. Conclusion

From the research done and the surveys conducted, it was identified that rather than the traditional method of teaching the students according to the curriculum alone, they get more enthusiastic when it goes hand in hand with updating and equipping them with latest technologies. The overwhelming response of the students on the sessions conducted in the iMac Lab enabled us to come up with ideas on workshops to be conducted in future.

8. Limitations

Incorporating technology and keeping students up to date with latest technological trends is the prime objective. Since the topic chosen here is domain-specific (Mac and iOS), the factors used to assess the sessions are also subjective and hence it cannot be expanded to other technological initiatives. In case of other technologies, other specific factors related to the domain needs to be taken account. Also the cost of setting up such a lab is relatively high.

Acknowledgement

The authors would like to express their gratitude to Executive President of Atharva college of Engineering, Hon. Shri Sunil Rane for his constant

support and encouragement all the time. A special thanks to the HODs of our college for providing us valuable information through discussions, especially to Mr. Mahendra Patil, Head of the department of Computer Engineering and Mrs. Nileema Pathak, Head of the department of Information Technology. We express our gratitude to Ms. Mansi, Training and placement officer of ACE for encouraging us to foster creativity in students. Also we thank all of the participants as students, faculty members and other authorities who took part in our survey for their valuable time in assessing our endeavors.

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