SOFTWARE ENGINEERING –A STUDY ON EFFECTIVENESS OF INDUSTRIAL VISITS IN MAPPING THEORY TO PRACTICE.

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Abstract

Outcome based learning emphasizes on students achieving the practical know-how after learning the theoretical concepts. The students who participated in the 'Software Engineering' coursework – in order to attain the practical knowledge of the course, the best option for practice was decided to be Industrial visits. This paper is about the advantages of the Industrial visits by the students who were grouped in teams and exposed to various Industrial practices and different tools. These visits were an advantage to students – they were able appreciate the theoretical concepts and understand it clearly, thus helping them in the course exam and also gain the confidence to work in the industry once they graduate.

Keywords: Industrial visit, Software engineering.

I. INTRODUCTION

Software Engineering course focuses on the concepts, principles, techniques, methodologies, tools, management and process of software development and maintenance. In addition, it includes the standards and norms of software development. Through the study of this course, students can take advantage of software engineering knowledge to analyze, design, implement and maintain software systems [1]. Studying Software engineering course in class room with the help of only text book materials and other conventional methods make it hard understand the subject; software engineering course deals with concepts related to software process models, requirements gathering and analysis, software design, and software testing [2]. The alternative is to make this subject interesting to students is by introducing them to the practical applications of the concepts taught.

The course can be made impactful and thought provoking by using many instructional teaching methodologies such as 'gaming methods' to impart knowledge more effectively [3,4,5], another alternative is 'project-based learning' where class is asked to develop project by team of students [6,7].

The most effective and very important method is through Industrial Visits for this course. The main objective of the course is to understand the working flow of the various software engineering methodologies – all the required knowledge can be gained effectively by visiting industries and finding out the diversity in the processes being followed in practice and their advantages. One would also understand the practical difficulties in the software design and implementation lifecycles and the improvements done to overcome them.

The modeling and learnings are not based on a single company visit alone. The groups visit multiple industries across the spectrum – from product to services and share the learnings about the standard processes, unique approaches, differences in theory vs practice and so on. These discussions make it a compelling learning for the classroom right from the point of deciding the company to visit till the completion of project evaluation. A discussion with the entire class in the end brings in a natural conclusion. There can be compulsory assignment activity where grades are provided in the end based on the performance during this entire industry visit process and capturing the learnings – thus ensuring students will actively take part in the assignments.

II. METHODOLOGY

A. Survey on Software Industries

The method practiced to achieve the practical attainment of the course is, group of three members are made among the 60 students in class. The choice of team members was given to the students and asked to visit the different companies according to the interest in their domain. By doing this every student will get a chance to explore the industry, have a chance of working and collaborating in the teams. This immensely helps the students later when they work in industry; students also improve their communication skills with outside professional world.

In the practice of Industrial visit, students gain lots of practical knowledge when they really visualize the working environment, included to that is also main focus towards gaining practical knowledge for the Software engineering course. Students were asked to concentrate on the following aspects.

- Organizational structure
- Software development life cycle(SDLC)
- Different software tools used in the industry and its uses
- Different software languages working on
- Working style or nature in the industry

All the above points will give clear practical knowledge to the students that which company uses what type of SDLC and why? The students would've learnt the theoretical approach in the class, by knowing the practical use cases the students can appreciate the use of each of the different types of SDLC deployed in that particular organization based on its scale and employability. If the Industry is using agile method then why is it practicing? Knowledge of Organizational structure is very important since, an established industry structure will be vast and hence the working methods involved in that organization vary compared to the start-up industry as the company structure will be small in scale and methods and processes very naïve or informal. Students will also be exposed to the world of existence of different types of tools used in industry and they can have a basic knowledge of using it. They will also gain insights in to generic tools across the industry versus specific sophisticated tools used only in that particular industry.

B. *Evaluation on The Survey*

Once all the groups completed their surveys, evaluation of the survey should be done and the proof of visit can be collected from the group members for the record.
The evaluation method for the Industrial survey was done as below

- Every group was asked to give a seminar on the Industrial visit survey with the presentation in class and documentation should be submitted accordingly
- Marks are awarded based upon the understanding on these main points below

  - Organizational Management Structure
  - Software Development Life Cycle (SDLC)
  - Tools identification in the current industry
  - Understanding and usage of tools
  - Team work

By practicing this method, students come to know about the information of the other industry practices visited by various teams -   students will also get to know the different Industry profiles and related information. We can also draw the conclusion that what are different tools and languages are highly used in industry and the ones that are obsolete – this can be through the results compiled after going through the presentations of all teams. We will get results on which is the tool and language which is highly popular and used in Industry. By the results drawn students can know and take decisions to master tools and languages. This working

knowledge of the tools and processes helps students to gain the confidence and be at ease when they actually join the Industry full time.

III. RESULTS

After doing the survey and evaluation, we can see from the evaluation result shown in Table I are the tools which are used in most of the companies where students visited.

From the Table I we can say that students got an idea of most trending technologies and tools used in companies,according to that students can concentrate on which tools they have master so that it helps them ramp up quickly and easily become effective in the industries.

SDLC	Agile
Development tool	Eclipse, Android Studio, Visual Studios
Development language	PHP, Java, Python
Testing Tool	Selenium
Repository tool	Git and GitHub
Database	MySQL, AWS, Firebase

TABLE I. Table of most trending tools in Industries(Sampling size 15+)

By giving the presentation in the class with team, the communication skills can be effectively improved and team management skills also attained through this activity . Team work plays very important role here as team members work in a co-ordinated fashion to vist the respective industry they chose, effectively communicate with the industry resource person and gain the required knowledge and share the same with other teams in the class.

IV. FEEDBACK FROM STUDENTS

Towards the end of the course of Software engineering, a course completion survey was undertaken where the students were asked to provide feedback related to the course teaching methodology involving Industrial visit activity and being a part of evaluation. According to the inputs received most of the students were very happy with the Industrial visits, they also mentioned it to be insightful and one of a kind experience in their engineering life. To see the working environment in the industry and getting connected with professional network excited them to learn more effectively when they came back to class room learning – there was increased interest. Sharing the information gained from the various groups was also an interesting part in this activity as students could effectively learn the concepts taught in the class. Though there was lot of

fun and excitement about visiting industries, some students found the exercise to be taxing. Identifying the industry contacts, permission to visit them and access to understand their processes was relatively a hard task for the students.
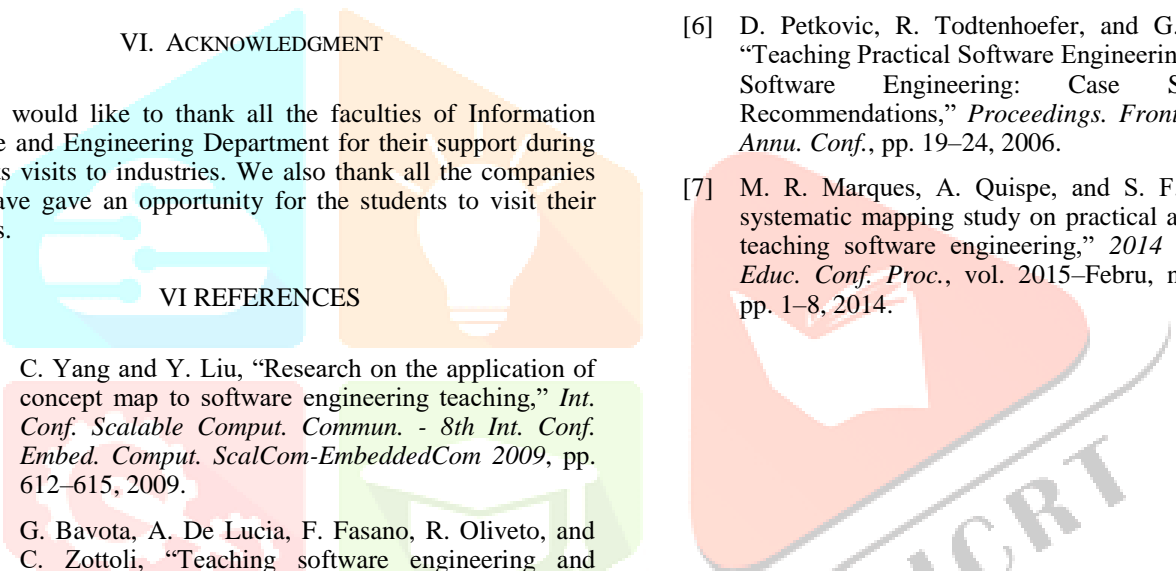
V. CONCLUSION

This paper presents advantages of industrial visit which maps the theoretical approach taught in the class room to the effective practical approach, students also gained the confidence of communicating with outside world to acquire industry knowledge. Working in a group enables students to share the knowledge and helps them to work in team. Finally, students came to know the trending technologies and tools which will help them to learn in advance before joining industries post-graduation.

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