Teaching by Case Method in Computing Education

Position Paper

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***Abstract*—This position paper proposes the need for researching the use of case teaching method in computing education and subsequently developing a case repository and set of practical tips on how case method can be incorporated into the different computing courses.**

Keywords—case-based teaching; computing education; case respository; teaching cases

I. INTRODUCTION

Faculty teaching computing courses face the difficult challenge of how to prepare students for the real world of computing practice. It is essential to teach concepts and principles but at the same time one has to somehow translate this directly into real-world activity, for example, in software engineering discipline, how to design, develop and maintain software solutions. Though some faculty have used case method for teaching computing courses, there has been no concerted effort by the professional computing communities to promote this pedagogy. Case method has been successfully applied in teaching other professions including law, medicine and business. Though there is great pedagogical value in case method, computing has not leveraged this method for teaching.

One of the main reasons for this is the lack of cases and a repository where faculty can search and find useful cases. Another is the fact that there is very little written and sharing among faculty on how to use cases when teaching technology oriented topics such as software engineering, programming, solution architecture, etc.

II. WHAT IS CASE METHOD?

The case method uses two elements namely the case, and a set of activities related to that case [1]. The case is a rich narrative that provides detailed information about a situation in which an individual or group must make a decision or solve a problem. Cases take many forms, and there are a variety of ways to write them. Usually it comprises the following:

- A detailed description of the problem's context which will at the least include the current situation and background information
- A character who plays the central role and is facing a problem that is to be solved
- Supporting data, this can include a range; data tables, quoted statements from the various actors in the case, supporting documents, images, video, or audio
- The case is not required to provide any analysis or conclusions

Students working on the case during the classroom activities focus on analysing the case to understand and explain the events, evaluate and propose solution options to solve the problem, predict the effects of taking actions, etc. The activities can be classified into the following four steps [2]:

1. Understanding the case-identifying the important facts of the case
2. Analysing the case by understanding the issues and challenges from multiple perspectives, evaluating solutions proposed in the case
3. Taking action by proposing alternate solutions, and evaluating the pros and cons of the solutions and their short- and long-term impact
4. Finally being able to "take away" the generalizable concepts and principles from the case

The activities can differ depending on the course that is being taught. For example, in a management oriented course, an activity can be answering discussion questions pertaining to the case, "Should the marketing manager launch the product?". In a technology oriented course, an activity can include the students having to design and evaluate solutions, "Propose and evaluate two alternative IT solution architectures for implementing the automated fulfilment process".

III. WHY IS CASE METHOD RELEVANT TO COMPUTING EDUCATION?

Case teaching method provides a number of benefits to enhance student learning through "interactive pedagogy" by stimulating critical thinking and problem solving skills and by creating reasonably realistic replicas of actual situations--which include incomplete information, time constraints, and conflicting goals [3]. This leads to enhances student motivation and well-aligned learning environment, where practice and theory come together. This is especially true when teaching technical topics through traditional lecture which is often very dry and boring. Following are some benefits of using cases in computing education:

- Helps to introduce real world scenarios and problems into the classroom
- Convey knowledge of what computing professionals do and how they work

- Develop effective problem-solving skills which are situated in a real world context
- Helps students to better connect theory and practice
- Enhance cooperative learning skills in the class

IV. WHAT SHOULD WE DO AS A COMMUNITY?

In order to drive the case method in computing education, as a community involved in teaching computing courses [4], we need to:

- Develop a set of sample cases that can be used in teaching specific computing courses, for example, object oriented design, enterprise integration, software testing, etc., and share them with other faculty.
- In order to enable sharing, we need to develop an online repository where faculty can submit teaching cases and also search and download teaching cases.

To drive the above actions, we intend to run Case Method for Computing Education (CMCE) workshops in major computing education conferences.

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