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Imparting Global Software Development Experience via an IT Project Management Course: Critical Success Factors

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Abstract: The rapid trend towards global sourcing of software development has put increased pressure upon U.S. educational institutions in order to provide such experience and relevant skill sets to their students. This presentation describes one such initiative between a Marquette University and Management Development Institute aimed at providing experience in global software development to their students. For others interested in undertaking such initiatives, this paper discusses some dos and don'ts.

1. Introduction

Spurred by cost efficiencies and improvement in telecommunications and technological infrastructure, the software industry has experienced an exponential growth in offshore outsourcing of the development function. In light of this trend, organizations have begun re-evaluating their information technology (IT) skill needs for the future with the understanding that several of the IT functions will be off shored [1]. This changing need has placed new demands on the U.S. education system to provide software engineering education with a global perspective. Higher educational

institutions are searching for creative ways to bring global systems development education into the classroom. This presentation describes one such collaborative initiative implemented at Marquette University (MU) and Management Development Institute (MDI), New Delhi, India.

2. Background of the initiative

MU received a grant from the 3M Corporation with the objective of examining changing workforce needs and developing an educational response to these needs. The response entailed identifying gaps between skills output from the educational system and skill needs of U.S. corporations. Further, it involved modification of IT curricula based in order to reduce the gap between needs and output. As a result of studies conducted at national levels [1], several skill sets were identified for future IT workforce needs. These included: (a) communication skills, (b) knowledge of and experience in project management concepts, (c) global awareness, and (b) comprehension and analysis of business functions. To equip students with these skills, MDI and MU faculty collaborated on teaching a software analysis and design course with virtual teams based in India and the U.S.

3. A model for global software education

3.1 The project setting

MU students enrolled in an undergraduate course on IT Project Management were paired with student teams at MDI enrolled in a master's level systems analysis and design course. Within this context, MU teams played the role of client project managers who outsourced systems analysis and design functions to the MDI teams. To this extent, MU teams conducted high level analysis and specifications function while MDI teams refined these high-level specifications and developed high level designs. The environment was constrained to the analysis and design function since (a) this was an experimental setting for increased future collaboration, (b) MDI and MU students being on different teaching schedules overlapped for only 1½ months, and (c) the nature of the collaborative courses dictated this format.

MDI teams also followed a co-sourcing model wherein some of the MDI teams co-sourced their work to another co-located team. This aspect of the teaching will not be presented in this panel but is available in a working paper [2] available from the presenter. Furthermore, this presentation will focus largely on the teaching environment created at MU.

3.2 Nature of software projects

In order to contain the teaching environment within a manageable scope, we did not use live projects for this initiative. Instead, projects were derived largely from prior service learning project used in other MU courses. Examples include developing a web-based donation management system, creating an online order placement system for a non-profit coffee company, and a volunteer management system.

3.3. Team structure and communication

Each MU team managed two MDI teams. This served two purposes: (a) it created an environment of multiple teams and project management most often faced in corporate settings, and (b) allowed the MU and MDI teams to learn from two different management styles. Consequently, one of the MDI teams was managed with low control while the other was managed with tight control. A description of how these different control levels were implemented is available in [2].

MU and MDI teams were allowed one week of socialization wherein they were required to develop team trust, work standards, and expectations. While they were not restrained in terms of what communication methods they used, most relied on instant messaging and e-mail exchange during the socialization period. Subsequent to socialization, MU teams communicated high level requirements to MDI teams and the teams engaged in about six weeks of analysis, design, and project management work. At the end of this period, MDI teams were required to deliver static versions of the proposed system.

4. Learning measures and outcomes

From an instructional perspective, it was our intent to impart skills consistent with the skill requirements described in section 2 above. To this extent, MU student teams were evaluated on the following deliverables and criteria: (a) weekly status reports from each team indicating areas of accomplishments as well as areas of slippage and reasons for such slippage; (b) weekly individual reflections indicating lessons learned regarding project management, global software development, and virtual team management and communications; (c) project deliverables wherein project deliverables from MDI teams were integrated with MU project team deliverables. The final deliverable contained all MU team communications with their MDI partners. Students were further evaluated on timely delivery of project components with required quality.

Course success was evaluated on three criteria: (a) student surveys reflecting learning regarding global software processes among other factors (b) anecdotal job placements credited to experience in this class setting, and (c) instructor and course evaluations.

5. Critical success factors

Several factors contributed to the success of this initiative. Firstly, MDI and MU faculty came together with two common interests – to provide global educational experience to their students and to develop a research agenda on virtual team collaboration. This commonality of interest served to provide a level of commitment may otherwise be challenging to sustain. Secondly, we observed very high levels of student enthusiasm for this course. This was likely because these were senior level students who better understood the value of global experience, the project setting was interesting and unique from prior projects they may have undertaken, and finally, because of close collaboration and monitoring by the instructor who rapidly addressed motivation issues as they arose. Thirdly, having students prepare risk management plans early in the process significantly helped to manage contingencies as they arose. Without such planning, frustrations may have been higher at both faculty and student levels. In other words,

students and faculty must both be prepared for ambiguity and contingencies along the way.

6. Cautions about global initiatives

Instructors interested in engaging in such initiatives must be aware of technological differences and must prepare their students accordingly. For instance, students at MDI used Rational Rose for their analysis and design work, a software that MU students had not used before. While this provided a great learning experience for students, it did lead to some level of discomfort with MU students. Students must also be made to understand time zone differences in order for them to best leverage this experience. Instructors must first familiarize themselves with cultural differences, work ethics, and even holiday patterns before students can be expected to comprehend their impact. Finally, at the undergraduate level, instructors must be prepared for significant time commitment and support towards the students in order for this to be a worthwhile learning experience.

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7. References

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