Incubating the Next Generation of IT Offshore Outsourcing Entrepreneurs

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Outline

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- Issue for CS education and CS students
- Responding to IT Offshore Outsourcing
- Our response: Providing Students with an IT Offshore Outsourcing Software Development Experience
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- Future work
Offshore Outsourcing

• **Outsourcing** is the delegation of tasks or jobs from internal production to an external entity (such as a subcontractor). [Wikipedia]

• **Offshoring** can be defined as relocation of business processes (including production/manufacturing) to a lower cost location, usually overseas. [Wikipedia]

• **Offshore Outsourcing** is the practice of hiring an external organization to perform some or all business functions in a country other than the one where the product will be sold or consumed. [Wikipedia]
IT Offshore Outsourcing 😊

• IT Offshored jobs include:
  – software development, software maintenance, IT documentation, telephone support, remote networking monitoring, software reengineering, systems management, and IT admin & operations [Wired, 2004]

• The Bureau of Labor Statistics projects that CS and IT jobs are among the fastest growing in 2002-2012, with 40-55% increases [BLS, 2003]

• Commonly cited reasons for IT Offshore Outsourcing include:
  – cost, accessing specialized skills or facilities, being able to increase or decrease developer head count as needed, and increasing development speed

• Over 70% of CIOs feel the cost factor is overrated in IT; typical savings are 15-25% the first year, and up to 40% later on [CIO Insight, 2003]
IT Offshore Outsourcing 😞

- The revision of the 2002 Forrester Research report predicts that:
  - 830,000 jobs will move offshore by the end of 2005
  - 3.4 million jobs and $136 billion in wages are expected to shift overseas by 2015
  - 25% of IT jobs will move offshore by 2015
  - 93% of IT workers are concerned by offshoring

- IBM and Accenture are rapidly expanding offshore activities
Issues for CS Education and CS Students

- Decline in CS enrollment
- Entry-level jobs are migrating to service-providing countries
- We can NO more prepare students for the *dotcom* world
  - What *technical* and "softer" skills will students need to employ to work and communicate as productive members of a *multi-cultural* software development team?
  - What roles will students play in a global market place?
    - World-class engineers, managers, and entrepreneurs
Responding to IT Offshore Outsourcing

- Provide real-life Offshore Outsourcing software development experiences by collaborating with institutions outside of the United States
  - Provide a balanced and first-hand view of the advantages, disadvantages and potential of IT Offshore Outsourcing
- Understand what are the skills students need to be productive in Offshore Outsourcing software development
  - Monitoring how students interact on project
  - Monitoring students communications (groups issues, problems, workarounds...)
  - Monitoring software engineering practices that work or do not work
  - Examining the link between communications activity with process undertaken, stages of project, deadlines and quality of product
Our Response

- Collaboration between Pace University in the US, and Institute of Technology of Cambodia (ITC), Phnom Penh
- Simulating Offshore Outsourcing in the classroom in software engineering capstone courses
Arrangements Prior to Semester

• **Discussions/agreement** with the corresponding professor
  – Country, culture, school system
  – Students background
  – Internet access
  – Creation of the syllabi
  – Projects
  – Tools/software engineering practices to be used

• **Choice of communication tools** (emails, chats, blogs, mailing lists, wikis...) and definition of a **protocol of communication** between professors, students, students/professors

• Definition of the **roles** of the students/professor
Setup: Projects

- **Project 1: ITC Schedule Builder and Classroom Assignment System**
  - Generate/view schedule and classrooms assignments and availabilities w.r.t. existing courses and faculty preferences

- **Project 2: ITC Students Information System**
  - Students registration management
  - View students information
  - Grades management
  - Courses management
  - Attendance management
  - Provide statistical results

- **Constraints**
  - Standard and protocols (documentation, coding, communication, software process..)
  - Use of Java, JDBC, Java Servlets, Oracle, Eclipse
Setup: Project Milestones

• Team bonding and initialization of the communications (1 week)
• Requirements (5 weeks)
• Design (4 weeks)
• Mid-semester presentations
• Implementation (2 weeks)
• Testing (2 weeks)
• Presentations (Last week of class)
Setup: Teams & Communications

• 5 teams, 19 Pace students, 13 ITC students
  – Students choose their teams
  – Projects are assigned to teams

• Extended teams: Reversal of traditional roles
  – Customers/end-users in Cambodia (2-3 students)
  – Developers in the US (3-4 students)

• Communications
  – How? Chats (AOL instant messenger), emails (mailing-lists), face-to-face meetings (local teams)
  – Initialization of the communications (first week of class)
Setup: Roles & Responsibilities

• US students:
  – “Capture” the requirements
  – Propose design options
  – Implement the software
  – Test the software
  – Handle requirements changes and integrate feedback
  – Deliver a software for their client
  – Report on the ITC team
  – Answer a weekly questionnaire
  – Maintain a web page for the project, maintain a blog, save all chats, archive emails
  – Describe and reflect on the software engineering process and communication protocol followed
  – Present their work professionally
  – Do a demonstration of their software
Setup: Roles & Responsibilities

- **Cambodian students:**
  - Describe environment/problem/software
  - Review and give feedback on the requirements, design and testing documents
  - Test the software
  - Report on the Pace team
  - Answer a weekly questionnaire
  - Accept or reject the software
  - Present their experience
  - Do a demonstration of the software
How to monitor Students Work?

- Strict **deadlines**
- Regular **deliveries** (with review/feedback and iteration)
- Weekly recording of the communications of the local and extended teams using an **online questionnaire**
- Maintain blogs, archive emails, save chats
- **Interviews** of the students by the professor and an external evaluator
- **Reflections** on the software engineering and communication processes
Communication Questionnaire

- To record chats, emails, face-to-face meetings
- When did the communication take place?
- Between whom the communication took place?
- What was the main topic of the communication?
- Was the communication more on planning, checking or a mixture of planning/checking?
- Was the communication useful or not?
- Use of http://www.questionpro.com
Preliminary Findings: Issues

• Availability of the client
• Very demanding client
  – Changes in requirements
  – Addition of functional requirements
• Coordination (semester/trimester and vacations)
• Language barrier
Preliminary Findings: Positive Points

- Software engineering
- Involvement of a client
- Multicultural experience
- Experience reflects a typical IT Offshore Outsourcing scenario (albeit reversal of traditional roles)
- Learn to overcome/deal with issues related to IT Offshore Outsourcing
- This experience helps students become more entrepreneurial
  - Discover the opportunities of being entrepreneurial in IT Offshore Outsourcing
  - Thinking about organizational/social/wider implications of what they are doing
  - Accountable and have to work with people they have never physically met
Preliminary Findings: Questionnaire Results

- Emails > Chats
- Chats take place mainly between 9 pm and 12 am
- Less chats as the project proceeds
- Emails are sent to the local or extended team rather than to an individual
- Communications are many to many, or through a mediator
- Students talk about the same things in the emails and chats
- Chats are used more for checking
- Emails are equally used for checking and planning
- Face-to-face meetings are used more for planning
Future Work

• Analysis of this semester results to be in a more knowledgeable position to repeat the experience

• Setup for next year:
  – Initial face-to-face preparation and agreement period with the Cambodian team during a field trip
  – Students should get a flavor on how to initiate and work out the ground rules for such projects
  – More bonding activities
  – Both sets of students will experience and learn about the problems and skills associated with both sides of the IT Offshore Outsourcing equation
  – Use of more sophisticated collaborative tools
Future Work

• How to influence and make suggestions to change the CS curriculum and better prepare our students in the IT Offshore Outsourcing context?
Thanks

• Pace University Students
• ITC Students
• AUF (Agence Universitaire de la Francophonie)