Impacting Global Software Development Through Socialization Activities in Virtual World Environments

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http://atlantis.seidenberg.pace.edu/wiki/gsd2008

ICT HANOI FORUM 2008
Outline

- Context
  - 4 years of international collaboration in global software development
  - Setup, tooling, software to be developed
- Emphasis on the social aspect of global software development by introducing socialization activities in virtual worlds
  - Why?
    - A poor client/developer relationship is one of the leading reasons for software failure
    - Social aspects of software development requires as much attention as the technical and management sides
      - Popularity of agile methodologies
- Study
- Findings
- Lessons and recommendations
First Step - 2005

Globalization

USA
Managers / Developers

CAMBODIA
Clients

<table>
<thead>
<tr>
<th>Tool type</th>
<th>2005</th>
</tr>
</thead>
<tbody>
<tr>
<td>Technical</td>
<td>Eclipse IDE with JUnit, MySQL</td>
</tr>
<tr>
<td>Communication</td>
<td>Yahoo IM, Yahoo groups, Web sites, blogs</td>
</tr>
<tr>
<td>Socialization</td>
<td>Yahoo IM, exchange of gifts</td>
</tr>
<tr>
<td>Project management</td>
<td>Website pages, blogs</td>
</tr>
</tbody>
</table>
**Globalization**

**Second Step - 2006**

**Integration**

- **USA**
  - Managers / Developers

- **CAMBODIA**
  - Clients

- **INDIA**
  - Sub-Contractors

### Tool type 2006

<table>
<thead>
<tr>
<th>Type</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Technical</td>
<td>Eclipse IDE with JUnit and CVS, MySQL</td>
</tr>
<tr>
<td>Communication</td>
<td>Yahoo IM, Yahoo groups, Web sites, blogs</td>
</tr>
<tr>
<td>Socialization</td>
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</table>
3rd Step - 2007

Globalization

Software engineering process

USA
Managers
Developers
Auditors
Mentors

Cambodia
Clients
Testers

India
Sub-Contractors

Entrepreneurs

Quality

Tool type | 2007
---|---
Technical | Eclipse IDE with JUnit and subversion, MySQL, java.net for issue tracking
Communication | Yahoo IM, Yahoo groups, wikis, blogs, videos
Socialization | Videos, Yahoo IM, exchange of gifts, videos
Project management | Wikis, blogs

RFP
4th Step - 2008

Globalization

Socialization

Competition

Technology

Software Engineering

CAMBODIA
Institute of Technology of Cambodia

INDIA
University of Delhi

THAILAND
Mahidol University

CAMBODIA
Royal University of Phnom Penh

CAMBODIA
Institute of Technology of Cambodia

US
Pace University
NYC Campus

US
Pace University
Pleasantville Campus

US
Students and IT Professionals
(Global Bank in NYC)

12 hours

9.5 hours

2.5 hours
Client quality coaches (5 US graduates) to help the client to baseline the requirements, create a versioning and requirements management process, and help prepare for acceptance testing and software selection.

Client (5 Cambodian ITC students) to manage the requirements and maintain a requirements wiki, and each student sponsors a development team.

5 development teams

5 versions of the software!

US NYC (6 students)

US PLV (4 student)

Thailand (4 students)

India (5 students)

Cambodia ITC (4 students)

Sponsorship

Developer quality coaches (5 US graduates) to help each development team to inject quality into their process and products.

Socialization team (2 Cambodian RUPP students) to help with socialization.

SQA trainees (4 Thai students) to shadow/learn from the coaches and auditors.

Auditors (16 US graduates and IT professionals) to provide early feedback on the requirements, audit each development team and externally test the software delivered. One student is the SQA Manager.

Developer quality coaching

Socialization coaching

Client coaching

Client quality coaching

SQA coaching

SQA training

Requirements (4)

Design / Prototype (4)

Code / Test (6)

Deploy / Maintain (5+)

Bonding / Setup (2)

Project with SQA (14+ weeks)

Framework for the Software Development Lifecycle - feedback and iteration triggered by coaching and auditing
Developed Software

- **MultiLIB** - ITC Computer Science Department Library Management System:
  - Paper-based
  - Support students, librarians, professors and administrators
  - Enforce the unique library policy
  - Maintain a holding of different types of resources (e.g., books, CD-ROMs, E-books, videos and students’ reports)

*Currently deployed and used at ITC*
<table>
<thead>
<tr>
<th>Activity</th>
<th>Tool</th>
<th>Rationale and tasks supported</th>
</tr>
</thead>
<tbody>
<tr>
<td>Requirements</td>
<td>MS Word, Chats, Email, Wikis, MS Word, Chats, Email, Wikis, Wikis*</td>
<td>Requirements gathering, elicitation and validation. Synchronous communication. Asynchronous communication. Requirements documents (versioned and drafts), FAQs.</td>
</tr>
<tr>
<td>Design</td>
<td>SmartDraw UML or similar</td>
<td>To model design options and achieve a better understanding of how the system should behave and correspond to client needs.</td>
</tr>
<tr>
<td>Implementation</td>
<td>Eclipse, Java/JSP, Apache Tomcat, MySQL, Netbeans/Visual Studio, C#/.NET</td>
<td>To take advantage of the IDE features, JUnit and Subversion plugins, and the externalization mechanism. To encourage students to build on their Java / JSP skills. To use an open source servlet container that would be easily deployable in Cambodia. To use an open source DBMS that would be easily deployable in Cambodia.</td>
</tr>
<tr>
<td>Testing</td>
<td>JUnit, Wink, Chat, Java.net, JUnit, Wink, Chat, Java.net</td>
<td>To automatically run unit tests and validate units of the software. For demos. For code walkthroughs. To validate software; clients and developers used the Issue Tracker facility of java.net to report, then fix and manage bugs respectively.</td>
</tr>
<tr>
<td>Configuration Management</td>
<td>Subversion</td>
<td>To contain all documents and software artifacts. To increase milestone visibility and awareness; To agree on shared architecture, approve database design, gain feedback on user interface mockups, clarify deployment environment, communicate responsibilities. Time awareness for meeting scheduling. Milestone and vacation awareness. Communication of tasks and status.</td>
</tr>
<tr>
<td>Project Management</td>
<td>Wikis*</td>
<td>To facilitate code sharing, change and version management.</td>
</tr>
<tr>
<td>Socialization</td>
<td>Second Life, Exercises, Photos, Chat, Second Life, Exercises, Photos, Chat, Face-to-face</td>
<td>Social experiment. Trigger understanding and learning. Putting faces to names for extended teams. To get to know each other and facilitate spontaneous conversation. To provide technical and team management assistance.</td>
</tr>
<tr>
<td>Coaching</td>
<td>Tools of the developers, Wikis, Wikis, Tools of the developers, Wikis, Face-to-face, chat, mailing lists</td>
<td>Training and guidance. Create and share useful resources. Communication with team.</td>
</tr>
<tr>
<td>Auditing</td>
<td>Wikis, Face-to-face, chat, mailing lists, Wikis, Face-to-face, chat, mailing lists</td>
<td>To disseminate checklists, access artifacts produced and post audits. Communication with team.</td>
</tr>
<tr>
<td>Instructor Oversight</td>
<td>Wikis, Mailing Lists, Survey, Wikis, Mailing Lists, Survey</td>
<td>To monitor progress and deliverables. To address problems and have students elaborate on particular questions asked by instructors for assessment purposes. Regular class meetings and scrum sessions with teams. To gather students’ perception on project, about RFP process, mentor / auditor experience and overall experience.</td>
</tr>
</tbody>
</table>
Virtual World Environnements

- Second Life by Linden Lab
- Wonderland by Sun
- Lively by Google
- World of Warcraft
- Used by universities for online teaching, recruitment...
- Used by companies for conducting meetings and training, maintaining contact with customers, marketing (e.g., IBM and Nike)
Research

- What is the impact of increased socialization effort on the nature of the client / developer relationship?
  - Increased socialization = Attempt to get a development team learning about the society and culture of the client through socialization activities (e.g., exchange of gifts and meetings in virtual worlds)
  - Impact = Influence on the cohesion of the global team (e.g., trust and knowledge of the team members) and the quality of the developed software
Experimental Design

Weekly Second Life sessions
Discussion on predefined topics (e.g., Khmer alphabet, movies, and Chinese and Khmer new years)
No voice, visual and textual only

Legend
G - Graduate students
UG - Undergraduate students
Second Life Party

- A Second Life party was organized for all the students of the project at the end of the semester.
Measures and Data Collection

- Design of an exercise that required the students to put the four countries and cities of the GSD project on a map of the world (*Map Exercise*).

- Design of an exercise that required the students to select the photos of their extended global team members out of the sixty participating students, and to put names to these faces (*Faces Exercise*).
Map Exercise – Knowing Cambodia

- City - Phnom Penh
- Flag - Cambodia
- Dish - Cambodia
- Landmark - Cambodia
- Time - Correct in Cambodia
Faces Exercise – Knowing Colleagues

- Recognize own client sponsor
- Name of own client sponsor
- Recognize another member of client team
- Name of another member of client team
- Recognize own developer coach
- Name of own developer coach
- Recognize all 3 own auditors
- Name of all 3 own auditors

Legend:
- Cambodia
- India
- NYC
- PLV
- Thailand
Findings

- **Client / Developer relationship:**
  - “SL helped me a lot to know the client’ background and culture... I could relate and predict her way of thinking”. [PLV student]
  - BUT the overall relationship between the client-side and development-side was seen to be no better and no worse

- **Quality of the developed software:**
  - No correlation between the socialization activities and the improved quality of the end product of the PLV team due to its multiple responsibilities

- **Technology for socialization must be chosen based on the background of the teams and activities must be playful (e.g., Second Life party)**
## Perception of Second Life

<table>
<thead>
<tr>
<th></th>
<th>Cambodia - RUPP</th>
<th>US - PLV</th>
<th>US - NYC</th>
<th>India</th>
<th>Thailand</th>
</tr>
</thead>
<tbody>
<tr>
<td>Previously heard about SL</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Prior game experience (platforms)</td>
<td>Desktop, online and mobile phone games</td>
<td>Desktop, online and Nintendo Wii games</td>
<td>Desktop, online, Nintendo Wii and DS and Sony PSP games</td>
<td>Desktop and online games</td>
<td>Desktop, online and mobile phone games</td>
</tr>
<tr>
<td>Serious or fun tool</td>
<td>Fun</td>
<td>Serious</td>
<td>Fun</td>
<td>½ Serious ½ Fun</td>
<td>Serious</td>
</tr>
<tr>
<td>Use earlier in project</td>
<td>N/A</td>
<td>N/A</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Good socialization tool</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Future use</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Activity</td>
<td>Objective</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>---------------------------------------------------</td>
<td>------------------------------------------------------------------------------------------------------------------------------------------</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Create shared calendars and use time zone software.</td>
<td>To know the time at each location and to be aware of when other students will and will not be available to work. Promote sensitivity for meeting scheduling and deadline management.</td>
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<tr>
<td>Exchange photos, bios and videos.</td>
<td>To put a name to a face – make the experience personal and the commitments real.</td>
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<td></td>
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<tr>
<td>Exchange of gifts.</td>
<td>To foster a stronger bond between parties based on giving and receiving. Exchanging something seeds a dialogue.</td>
<td></td>
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<tr>
<td>Web site or wiki with shared resources.</td>
<td>Promote learning about each other, not just the project-specific materials.</td>
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<tr>
<td>Chatting / instant messaging.</td>
<td>To support unscheduled, quick and informal discussions. Encourage them and perhaps schedule them to ensure they happen.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Group announcements / Emails.</td>
<td>To promote shared awareness and create a sense of community. For instance, send holiday wishes to those team members having a national holiday and remind other extended team members.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Socialization exercises.</td>
<td>To enable students to recognize what they should but don’t know about those they are working with. Our map exercise was designed to see if students knew anything about the countries while the faces exercise was designed to check whether they recognized team members.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Use of virtual world environments.</td>
<td>To forge a visual and more physical connection with team members and places. Simulate face-to-face encounters.</td>
<td></td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>
For More Information...

See our GSD2008 wiki:
http://atlantis.seidenberg.pace.edu/wiki/gsd2008

... and contact me or any of the global professors
Thanks

- This work is supported by a National Collegiate Inventors and Innovators Alliance grant (#3465-06), “Incubating the Next Generation of GSD Entrepreneurs” and a Campus Second Life scholarship.

- We thank all 60 students who have been involved in 2008.