On-line Communities of Practice

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Outline

• Introduction
• Information and Knowledge
• Archival Journals
• On-line Community software
• Conclusions
Acronyms

- KM = Knowledge Management
- CoP = Community of Practice
- CoI = Community of Interest (often made up of numerous communities of practice, ie community of communities)
- EIP = Enterprise Information Portal
- CMS = Content Management System
- CIC = Computing, Information, and Communication
- JACIC = Journal of Aerospace Computing, Information, and Communication
Information and Knowledge

- Information is not knowledge
- Information is usually simply “data” (numbers, text, images, sound, …)
- Knowledge is:
  “… a fluid mix of framed experience, values, contextual information, and expert insight that provides a framework for evaluating and incorporating new experiences and information”
- And wisdom is more than just knowledge

(Davenport and Prusak)
Information

• We are all drowning in information, and it will keep growing exponentially
• I have 4 GB’s of email going back 15 years
• I have 7 GB’s of webpages
• I have 20 GB’s of documents
• My grad students could fill a terabyte of disk space in a day with research results
Knowledge

- There are (at least) two types of knowledge:
  - Tacit and Explicit
- Tacit knowledge is stored in the brain
- Explicit knowledge is represented by papers, videos, etc.
- Perspective is important, one person's "explicit knowledge" is another person's "information"
- Conference papers and archival papers are an attempt to transfer tacit knowledge from one person to another
- Human-human interactions are crucial to effective and efficient knowledge transfer (i.e., "story telling"), which might be why Schweitzer emphasizes "Discussion"
- How can we convert all this information to knowledge?
Knowledge Management (KM)

- KM is crucial for corporations, the defense department, Universities, and any other large organization
- KM is 95% culture-people-politics-process and 5% Technology
- How do we get people to join an on-line community and share information, which we hope leads to increased productivity and innovation? (And increased knowledge)
Communities of Practice (CoP)

- “Communities of Practice are groups of people who share a concern, a set of problems, or a passion about a topic, and who deepen their knowledge and expertise in this area by interacting on an ongoing basis.” (Wenger)

- “CoP’s are not just a web site, a database, or a collection of best practices. It is a group of people who interact, learn together, build relationships, and in the process develop a sense of belonging, and mutual commitment.” (Wenger)

- “Without Communities of Practice their can be no knowledge management.” (Wenger)

- In the last 10 years electronic CoP’s have been developed that are very effective (e.g. companycommand.army.mil with 20,000 members)
CoP Sizes

- **<15 people**: Very intimate group,
  - e.g. PSU rowing club, team of faculty on a grant, all aerospace faculty,
- **15 – 50 people**: Variety of relationships,
  - e.g. all PSU Bookstore employees,
- **15 – 150 people**: Tend to divide into subgroups,
  - e.g. all faculty in College of Engineering
- **> 150 people**: Subgroups start to develop own identities.
  - e.g. all subscribers to Jnl. of Experimental Biology, all PSU students, all PSU faculty, …

Software solutions and nature of interactions for each of these groups might be different!

PSU has the entire range of group sizes, and a diverse group of people/needs.
CoP’s Have Very Different Needs

- **Small**
  - PSU rowing club
  - Team of faculty on a grant
  - Team of faculty working on a proposal

- **Medium**
  - All aerospace faculty
  - All ASET employees

- **Large**
  - All faculty in College of Engineering
  - All engineering students

- **Very Large**
  - All subscribers to Journal of Experimental Biology
  - All PSU students
  - All PSU faculty
  - All Army Captains
CoP Technologies

Common CoP Features

We’d need to link all of these capabilities (and more) seamlessly
CoP Model: Participation*

- Leader
- Core group
- Practitioners
- Subject matter experts
- Occasional
- Peripheral
- Lurkers
- Outsiders
- Beginners

Varying levels of access and involvement

*From the work of Etienne Wenger*
Angel

• I don’t use Angel, have never seen a need for it
• I’ve been writing webpages for my courses since the web was created
• Penn State chose Angel because:
  ■ “architecture that anticipated modularity, transportability, and scalability and encouraged customization “
  ■ “an enterprise platform that fit easily with the school's student system and other business systems “
  ■ “easy to use with numerous communication, collaboration, assessment, and content delivery features”
  ■ From: http://www.cyberlearninglabs.com/AboutUs/psuProfile.asp
• I don’t think it is scalable, or fits well with our other systems, or has numerous communication and collaboration features … but it is easy to use
Some PSU Activities

• Zope users group:  http://zope.psu.edu
• LionShare: http://lionshare.its.psu.edu
• http://www.ist.psu.edu/ContentManagement/Resources/index.cfm
• http://ais.its.psu.edu/online_documentation/reddot_content_mgmt_user_guide.html
• http://www.ist.psu.edu/ContentManagement/
• http://apps.libraries.psu.edu/WebRedesign/Documents/ccspresentation.ppt
Archival Journals

- The foundation of science and engineering
- Paper versions are expensive to produce, distribute, and store
- Information that is not on-line will be used (and referenced) less and less (“if it isn’t online, it doesn’t exist”)
- The American Institute of Aeronautics and Astronautics (AIAA) has its entire archive of conference and journal papers scanned and available on-line (40 years of technical papers) (www.aiaa.org)
- NASA has begun to convert both NACA and NASA papers to electronic form
  - [http://techreports.larc.nasa.gov/ltrs/ltrs.html](http://techreports.larc.nasa.gov/ltrs/ltrs.html)
  - [http://ntrs.nasa.gov](http://ntrs.nasa.gov)
  - [http://naca.larc.nasa.gov](http://naca.larc.nasa.gov)
- Others:
- Problems: Lack of permanent URLs and lack of digital document formats that appear the same over a very long period of time
The Journal publishes qualified papers in areas such as real-time systems, computational techniques, embedded systems, communication systems, networking, software engineering, software reliability, systems engineering, signal processing, data fusion, computer architecture, high-performance computing systems and software, expert systems, sensor systems, intelligent systems, and human-computer interfaces.

…and this scope will evolve in time.

(www.aiaa.org/jacic)
JACIC Features

• Traditional Journal Features:
  - Information (papers)
  - Face-to-Face meetings (conferences)
  - Peer-Reviewed content (Editor-in-Chief, Associate Editors, and Reviewers)
  - Archived (ISDN number 1542-9423)

• New Features:
  - On-line digital papers
  - Hypertext documents
  - Multimedia (videos, sound, computer codes, raw engineering data, …)
  - Rapid access to experts thru member directory

• Future Possible Features:
  - Discussion forums (information and knowledge exchange)
  - Rapid (instantaneous) publishing of new information (not peer reviewed)
  - Archive of interactions
  - Information flow in both directions (authors to readers and readers to authors)
  - Dynamic webpages where the community adds content, not simply the webmaster

Human Interactions facilitate the transitioning of information to knowledge
The merging of Journals and CoPs will create a system for creating new knowledge while balancing that knowledge with a validation scheme. The CoP and the journal should meet through a multi-tiered validation system that transports CoP style informal conversational knowledge into fully validated explicit knowledge (see journal Science).
None of these People can add content To the website. This stifles communication
Software Approaches for CoPs

- Opensource software
  - PHP / MySQL (eg PostNuke, Drupal, phpWebSite)
  - Zope
  - OpenCMS
  - TikiWiki
  - Many others…
- Commercial software:
  - MS SharePoint Portal or SharePoint Services
  - Tomoye Simplify
  - RedDot
  - Many others…
- Hundreds of solutions…

• http://www.cmswatch.com/ContentManagement/Products/
Software Approaches for CoPs

• **OpenSource software**

  - Software is free, will require manhours though
  - LAMP (Linux, Apache, mySQL, PHP) ([www.postnuke.com](http://www.postnuke.com))
    - [www.platoonleader.com](http://www.platoonleader.com)
    - ics.aero.psu.edu
    - Not elegant, modules do not all have same look and feel
  - Python based
    - Plone / Zope ([www.zope.org](http://www.zope.org)) ← Univ. Michigan chose this
  - Java and XML based
    - OpenCMS ([www.opencms.org](http://www.opencms.org))
  - TikiWiki ([tikiwiki.org](http://tikiwiki.org))
    - PHP, ADOdb, Smarty
Software Approaches for CoPs

- MS SharePoint Portal or SharePoint services
  - Expensive for small groups, real expensive for large groups
  - SharePoint Services is part of MS Windows 2003
  - SharePoint Portal lets you tie SharePoint Services together
  - see: www.aiaa-cstc.org
  - MS Windows only environment, very restrictive
  - OK for small groups
  - Not recommended, typical MS software…. But we use this for small (<20) groups
Software Approaches for CoPs

• Tomoye Simplify
  - Expensive ($40K), but great approach
  - see: companycommand.army.mil
  - see: www.tomoye.com
  - Their next release is all Microsoft based (C# and .net, ugh)
  - Everything (business card, document, discussion, weblink, quiz, ..) is a knowledge object which can be linked to other objects. This is key.
  - Even if you don’t buy this, study it, they are good
CoP Software

- The most difficult thing for most people to understand is that most CoP sites let ALL MEMBERS modify the website content (and very easily).

Traditional Webpage

- The “Webmaster”
  - Web Browsers

CoP

- The Community IS the Expert
  - Everyone can easily change content thru web browsers (to a degree)

This causes tension because people don’t have control anymore…but this is good.
Access Control Lists

- ACL’s are crucial to making it all work
- In a CoP, the various levels of users require different levels of access (none, read, edit, delete, manage, ...).
- This refers to more than just file access, it also refers to the layout of the website, user accounts, access to various portions of website, ...
- PostNuke has very detailed security system, but it is hard to use
- Portions of CoP might be open to world, and portions might require high security
Databases are Key

• Almost everyone that needs a CoP needs a database
• Need to be able to search
• Need to be able to organize data, images, audio, people, …
• Important to have all elements of a CoP searchable (users, docs, weblinks, discussions, …)
PSU has the pieces

- Distributed File System
- Oracle Calendar system
- Ph directory
- Web servers
- Email system
- Instant Messaging
- Listserv
- Databases ???
- Blogging ???
- Need all aspects of the CoP well integrated, not a crude patchwork of partial solutions (e.g., Tomoye is great, Postnuke is not)
- Need to make it easy. Few people can write html, php, cgi, etc. code (PostNuke, Tomoye, Zope, OpenCMS, etc. are very easy to use)
- There are bound to be security issues
- There are bound to be copyright issues
Any member can change anything on this site!!
A Web site by and for Company Commanders--past, present, and future... [read more]

Photo: Dexter Holley (B/2-72 AR)

COC: Is CC.com making a difference for you?

During Oct/Nov, we are focusing on Training. Go to that section of the site, take this month's CMD Quiz, join ongoing discussions, and contribute your training ideas.

**Most Recent Discussions:**
To post discussions, you must be registered and logged on.

<table>
<thead>
<tr>
<th>Discussion Forum</th>
<th>Thread</th>
<th>Posts</th>
<th>Last Post @</th>
</tr>
</thead>
<tbody>
<tr>
<td>CompanyCommand General Discussion</td>
<td>1SG Duty Description</td>
<td>2</td>
<td>2003-10-22 5:00 pm</td>
</tr>
<tr>
<td>Training: Open Discussion</td>
<td>CS/CS5 Battlefield Survivability</td>
<td>7</td>
<td>2003-10-21 11:50 pm</td>
</tr>
<tr>
<td>CompanyCommand General Discussion</td>
<td>Convoy Operations Lessons Learned Needed</td>
<td>7</td>
<td>2003-10-21 11:33 pm</td>
</tr>
<tr>
<td>Warfighting Discussion</td>
<td>Civilian GPS in Iraq</td>
<td>7</td>
<td>2003-10-21 0:47 pm</td>
</tr>
<tr>
<td>Training: Open Discussion</td>
<td>Training TIPS: What is working?</td>
<td>5</td>
<td>2003-10-21 4:07 pm</td>
</tr>
<tr>
<td>CompanyCommand General Discussion</td>
<td>Body Armor</td>
<td>6</td>
<td>2003-10-21 2:20 pm</td>
</tr>
<tr>
<td>Fitness Discussion</td>
<td>Profile PT Program</td>
<td>1</td>
<td>2003-10-20 3:09 pm</td>
</tr>
<tr>
<td>Video OPD: Open Discussion</td>
<td>Leadership in Operation Iraqi Freedom</td>
<td>2</td>
<td>2003-10-19 6:00 pm</td>
</tr>
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<td>Training Quiz: Open Discussion</td>
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<td>2003-10-19 8:53 am</td>
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<tr>
<td>CompanyCommand General Discussion</td>
<td>Change of Command</td>
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<td>2003-10-15 11:53 pm</td>
</tr>
</tbody>
</table>
www.companycommand.com

- Largest and most successful CoP in the DOD
- Created to help army captains share information and knowledge
- ~80,000 hits/month & 20,000 regular members
- Enormous amounts of information available (not open to public anymore)
- Run by four Army Majors (all West Point professors)
- Often the Generals do not have all the knowledge that the soldiers need (e.g. soldiers returning from Iraq can transfer their knowledge to new soldiers)
- On-line video interviews of soldiers in Iraq and Afghanistan
- Began with PHP/mySQL but now uses Tomoye Simplify
Some CoP’s

- http://ics.aero.psu.edu (Linux, PHP, MySQL)
- http://www.aiaa-cstc.org/ (MS SharePoint, secure)
- www.companycommand.com (Tomoye Simplify)
- www.tomoye.com (Tomoye Simplify)
- http://www.guerrillakm.org/
Conclusions

• We must make it easy for students, staff, and faculty at PSU to create their own CoP’s (this ought to be as easy as setting up a ListServ)
• Need to recognize different social and needs of various groups (small or large, informal or formal, open or secure, …)
• Need to recognize different software needs of various groups
• Need to find a solution that works well with current infrastructure (DFS, PH, Kerberos, web servers, …)
• Needs be open (MS, Mac, Linux, UNIX)
• Needs to be scalable
• Needs to be secure
• This could have a larger impact than anything else we do at PSU
References

• Rick Wallace, V.P. of SAIC, CoP Short Course, Army Knowledge Management Symposium, 2003
• Hubert St Onge and Debra Wallace, Leveraging Communities Of Practice For Strategic Advantage, 2002
• Schweitzer seminar: http://www.ics.psu.edu/fallnotes/cop1.pdf