

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 persons “explicit knowledge” is another persons “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 (ie “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 there 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

Very different

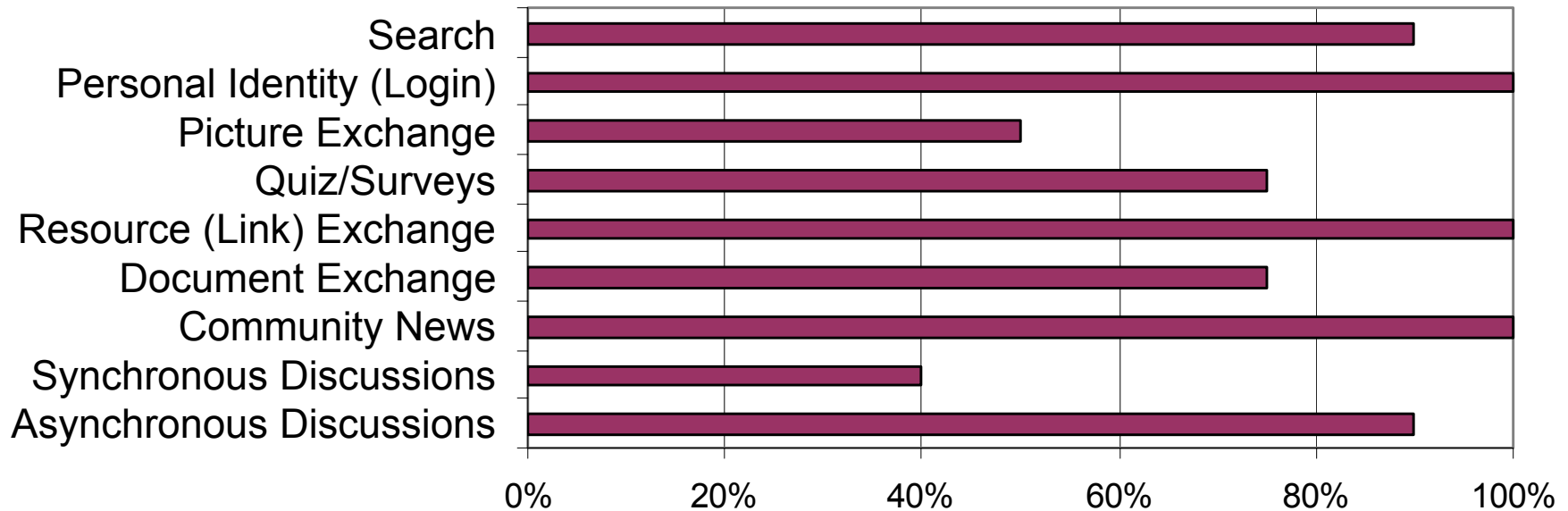


Very different



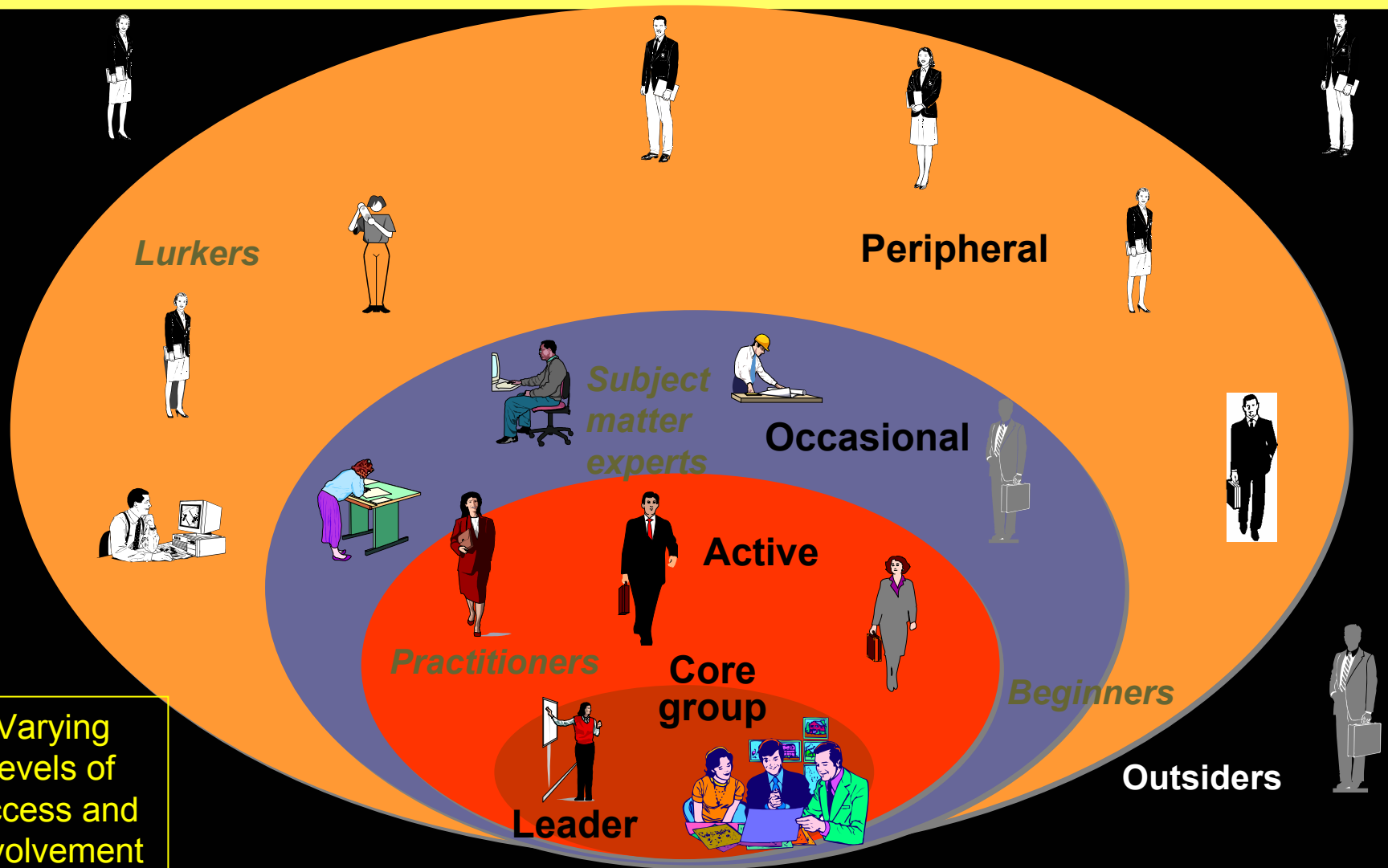
CoP Technologies

Common CoP Features



We'd need to link all of these capabilities (and more) seamlessly

CoP Model: Participation*



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://ntrs.nasa.gov>
 - <http://naca.larc.nasa.gov>
- Others:
 - <http://www.jstor.com> , <http://www.acm.org> , <http://scholar.lib.vt.edu/theses/>
- Problems: Lack of permanent URLs and lack of digital document formats that appear the same over a very long period of time

Journal of Aerospace Computing, Information, and Communication

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

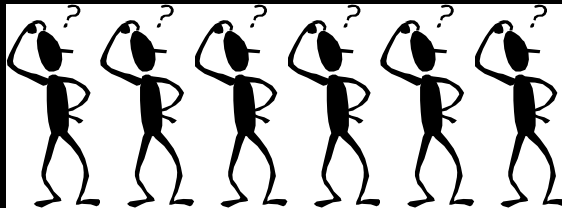
- Traditional Journal Features:
 - Information (papers)
 - Face-to-Face meetings (conferences)
 - Peer-Reviewed content (Editor-in-Chief, Associate Editors, and Reviewers)
 - Archived (ISDN number 1542-9423)
- New Features:
 - On-line digital papers
 - Hypertext documents
 - Multimedia (videos, sound, 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

Archival Journals

CoP

The Expert

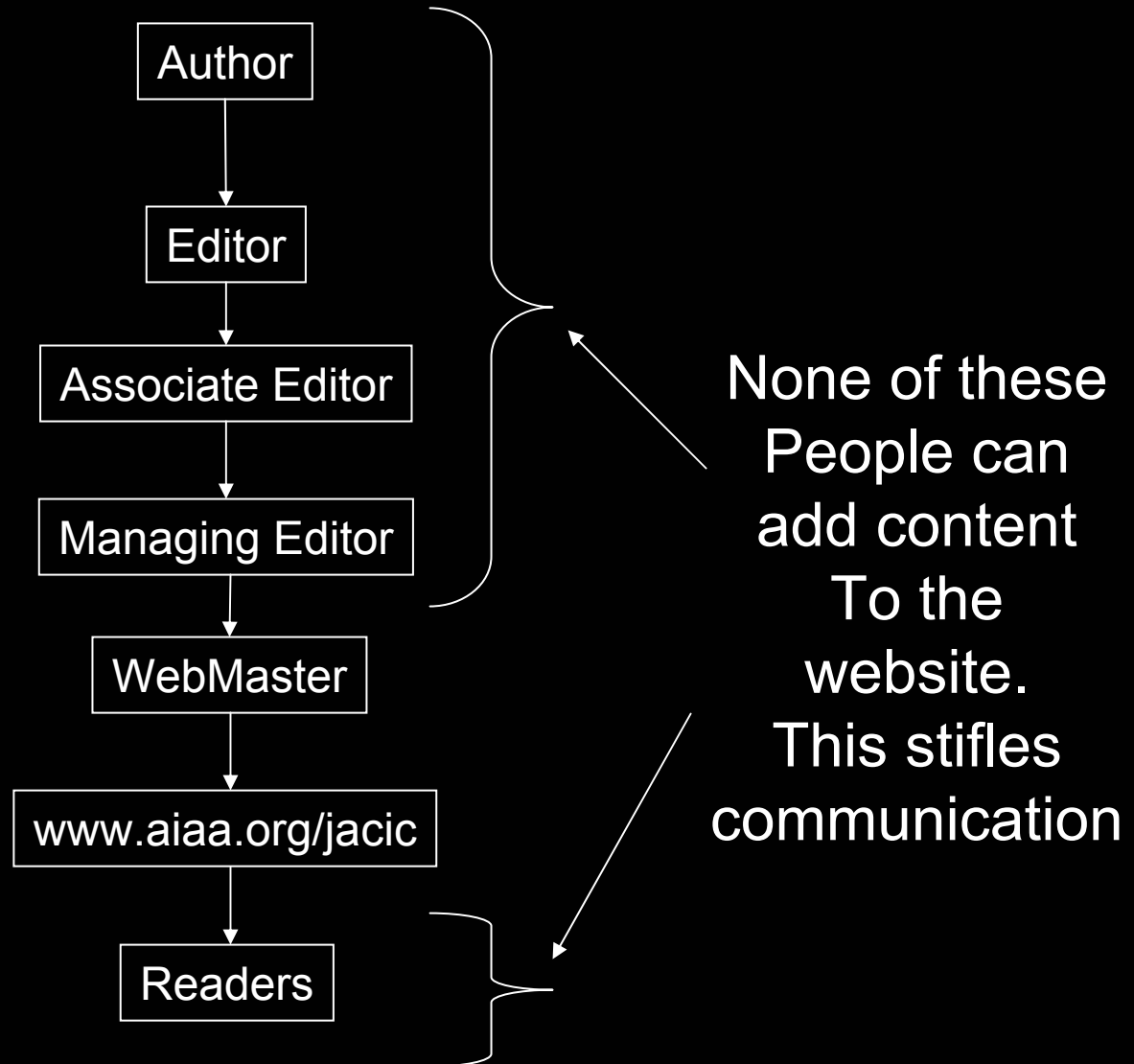


The Community IS the Expert



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*)

Current Journal Operations



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)
 - 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) ← Univ. Michigan chose this
 - Java and XML based
 - OpenCMS (www.opencms.org)
 - TikiWiki (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

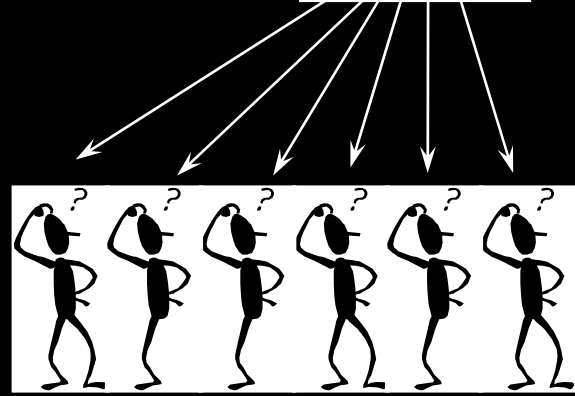
- Tomoye Simplify
 - Expensive (\$40K), but great approach
 - see: companycommand.army.mil
 - see: www.tomoye.com
 - Their next release is all Microsoft based (C# and .net, ugh)
 - Everything (business card, document, discussion, weblink, quiz, ..) is a knowledge object which can be linked to other objects. 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

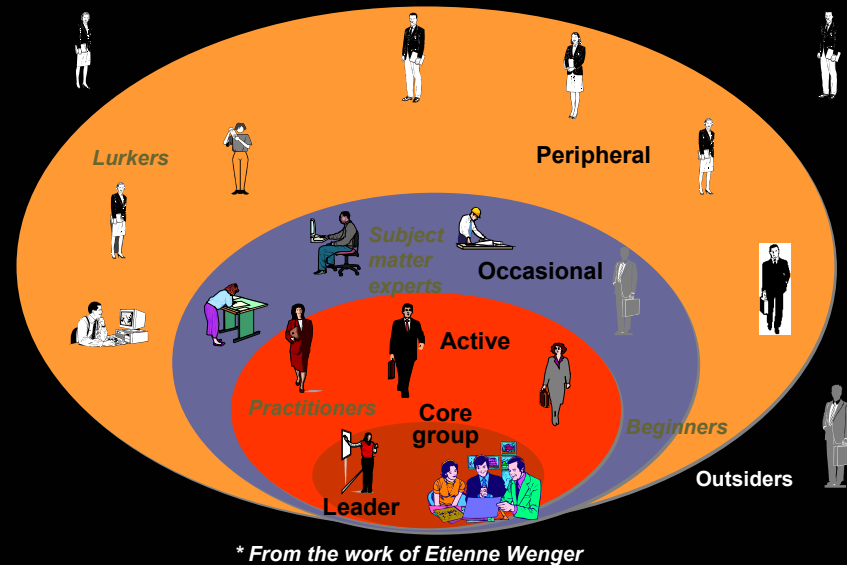


Everyone can easily change content thru web browsers (to a degree)

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 (eg 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



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- [AIAA Website Changes Discussion](#)
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- | | |
|---------------------|---|
| 10/20/2003 12:00 AM | 18th Annual OOPSLA
Object Oriented Programming, Systems, Languages and Applications |
| 10/30/2003 12:00 AM | Intl. Conf. on Compilers, Architectures and Synthesis for Embedded Systems
Demand for high performance embedded computing and increases in complexity of embedded software require leveraging diverse architecture, microarchitecture and compiler research. Application-specific solutions are needed in embedded areas, such as digital... |
| 11/10/2003 12:00 AM | 15th Syposium on Computer Architecture and High Performance Computing
SBAC-PAD is an international annual conference, started in 1987, which has continuously presented an overview of new developments, applications, and trends in parallel and distributed computing technologies. SBAC-PAD is open for faculty members, researchers,... |
| 11/19/2003 3:00 PM | Joint TC Telecon
Call in Number to be provided on 11/17. |
| 1/5/2004 12:00 AM | AIAA Aerospace Sciences Conference
The 42nd AIAA Aerospace Sciences Meeting and Exhibit with its traditionally multidisciplinary character provides an ideal forum for scientists and engineers from industry, government, and academia to share and disseminate the scientific knowledge and... |
| 1/5/2004 9:00 AM | Joint TC Meeting |

Links

[Add new link](#)

- [AIAA Conferences](#)
- [JACIC \(new Journal\)](#)
- [DASC Website](#)
- [AIAA SSTC Web Site](#)
- [AIAA CSTC Web Site](#)
- [Main CSTC Web Site](#)
- [AIAA Technical Committees](#)
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Any member can
change anything
on this site !!

Institute for Computational Science

<http://ics.aero.psu.edu> and <http://ics.psu.edu>

ICS FORUM

Institute for Computational Science

Nov 03, 2004 - 09:05 AM

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Who's Online

We have 1 guest and 0 members online

You are an anonymous user.
You can register for free by clicking [here](#)

Welcome to ICS Forum. An online community where YOU control the content!

Welcome to ICS Forum. This site is for all computational science faculty, staff, and students at Penn State. This site supplements the main ICS site: www.ics.psu.edu. On this site you can:

- ◆ Share documents
- ◆ Have discussions
- ◆ Announce news, events, and opportunities
- ◆ Search for employers or a job
- ◆ etc.

To get started follow these steps:

- ◆ Sign up for an account
- ◆ Then click on "Your Account" and "Change your info"
- ◆ Then upload your resume/vita in the Documents category, so people can find your area of expertise.

This site is under development, if you have comments or suggestions, please send them.

Welcome!

Dr. Lyle N. Long
Director, Institute for Computational Science
Professor of Aerospace Engineering

Note: no taxonomy

Quotes

*Science is organized knowledge.
Wisdom is organized life.*

-- Immanuel Kant

User's Login

Username

Password

Remember me

Don't have an account yet? You can **create one**. As a registered user you have some advantages like a theme manager, comments configuration and posting comments with your name.

Poll

Interest Area

companycommand.army.mil

(uses Tomoye Simplify)

[How to Start???](#)

[Contact Us](#)

CompanyCommand
companycommand.com

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[Go Team](#) > CompanyCommand

guest (Read)

LOGIN

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Password

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CompanyCommand
Building Combat-Ready Teams!



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A Web site by and for Company Commanders--past, present, and future...[read more](#)

Photo: [Dexter Holley \(B/2-72 AR\)](#)

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- Force Protection
- Maintenance
- Supply
- Soldiers & Family
- Pro Readings
- Rally Points
- Cdrs' Log

[Collapse All](#)

[Site Map](#)

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

Discussion Forum	Thread	Posts	Last Post @
CompanyCommand General Discussion	1SG Duty Description	2	2003-10-22 5:08 pm
Training: Open Discussion	CS/CSS Battlefield Survivability	7	2003-10-21 11:58 pm
CompanyCommand General Discussion	Convoy Operations Lessons Learned Needed	7	2003-10-21 11:35 pm
Warfighting Discussion	Civilian GPS in Iraq?	7	2003-10-21 6:47 pm
Training: Open Discussion	Training TTPs: What is working?	5	2003-10-21 4:37 pm
CompanyCommand General Discussion	Body Armor	6	2003-10-21 2:20 pm
Fitness Discussion	Profile PT Program	1	2003-10-20 3:09 pm
Video OPD: Open Discussion	Leadership in Operation Iraqi Freedom	2	2003-10-19 8:08 pm
Training Quiz: Open Discussion	Training in Operational Environment	1	2003-10-19 8:51 am
CompanyCommand General Discussion	Change of Command	7	2003-10-15 11:53 pm

Visit our Sister Site
[PlatoonLeader](#)

CMD Quiz

Q: Does "training" fit into an operational environment?

Take Quiz

[View Results](#)
19 Comments

Featured

in CompanyCommand

- [Growing the Next Generation of Leaders](#)
- [To Kill or Not to Kill: a Cdr Sets the Example](#)
- [Training Priorities: What is Important to You?](#)
- [Cdrs' Log](#)
- [Training TTPs: What is working? \(5\)](#)
- [Company Commanders' Combat Observations / Lessons Learned](#)
- [Interviews with Company-Level Leaders in War](#)

Featured Challenge:

[Commander Stress](#)

[Take the Challenge](#)

Featured Video OPD:

CMD Update

[AUG/SEP 2003 C-LL Newsletter \(Issue #26\)](#) ★★☆☆☆ The CDR/1SG Relationship (1 comment)

Special Book Program

platoonleader.army.mil

(uses mySQL and PHP, ie free software)

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CompanyCommand

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19:03 Bragg 18:03 Hood 16:03 Lewis 08:03 Korea 04:33 Afghanistan 03:03 Iraq 01:03 Bosnia

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Recent Tools

- 026 Cheat Sheet
- APFT Roster Score...
- 11 ACR Miles Inve...
- Retrans Team Trai...
- 2-69AR Convoy Ops...

What's HOT!



Physical, Cultural, and Military
Geography of Iraq—PDF

Survey

The most important Leader
Competency is:

21 Oct 0630 EST



Check out some of the Q&A's from some company leaders currently serving in IRAQ: **Video OPD, LT O'Hern; A Wise LT, CPT Morgan, Jake Jacobs, 2LT Blickhahn, LT Mitroka, LT Stuewe, LT Mason, CPT Polsgrove, CPT Woodward, CPT Zinn, Shock Troop and CPT Toti, CPT McGahey, 2LT Mead, CPT Wrann, LT Pickler, LTC Barbee, 1LT Marcee.**

Monthly Newsletter: **Register here!**

Recent discussions in the PL Forums

Forum	Topic	Replies	Views	Last Post
Special Forces	General Boykin	11	377	10/22 18:27
Pre-Commissioning Questions	Grossly unprepared	7	444	10/22 18:04
Field Artillery LT's	Wait on FAOBC	1	57	10/22 16:39
Armor LT's	Armor OBC, November 17, What t...	10	341	10/22 15:38
Transportation LT's	Eustis Suggestions	18	414	10/22 14:13
Platoon Leader Questions	Hard headed squad leader	28	1374	10/22 13:44
Platoon Leader Questions	Conduct in Uniform	28	1671	10/22 12:24
Platoon Leader Questions	Any thoughts...	14	1025	10/22 11:44
Field Artillery LT's	Cell Phone service at Ft. Sill...	3	88	10/22 11:29
Aviation LT's	What to do?	8	342	10/22 10:44
MI LT's	MI vs other branches	2	234	10/22 01:20
Transportation LT's	deployments in the 6th batalli...	2	75	10/21 20:52
Quartermaster LT's	Duty Stations CONUS	1	67	10/21 19:13
Armor LT's	Not taught in AOBC	1	238	10/21 18:56
Reserve Component Issues	Paying for OBC	6	234	10/21 16:44

Read ALL forum postings since your last visit
Only works if you are Registered & Logged On

Daily Quote

"The essential thing is action. Action has three stages: The decision born of thought, the order or preparation for execution, and the execution itself. All three stages are governed by will. The will is rooted in character, and for the man of action character is of more critical importance than intellect. Intellect without will is worthless. Will without intellect is dangerous."
-- Von Seek

Email Us your Quote

Who's Online

There are currently, 24 guest (s) and 6 member(s) that are online.

drill_lt, SEPPL, more...

You are Anonymous user. You can register for free by clicking **here.**

Last Seen

LtGoForBroke: 54 seconds ago
M_Raymond: 2 minutes ago
Drill_LT: 6 minutes ago

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
- Etienne Wenger, Richard McDermott, and William Snyder, *Cultivating Communities of Practice*, Harvard Business School Press, 2002
- Hubert St Onge and Debra Wallace , *Leveraging Communities Of Practice For Strategic Advantage*, 2002
- Davenport, T. H. and Prusak, L., *Working Knowledge: How Organizations Manage What They Know*, Harvard Business School Press, 2000
- Long & Schweitzer, paper:
http://www.personal.psu.edu/lnl/papers/aiaa2004_1264.pdf
- Schweitzer seminar:
<http://www.ics.psu.edu/fallnotes/cop1.pdf>