Improving Information Usage, Quality, and Management By Developing Personal Unit Ware

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Abstract

This paper investigates improving information usage, quality, and management as persons building their own knowledge. Improvement is made by modeling the knowledge by units which highly depends on the style and behavior of the personal integration process. Units are to improve the usage of information as minimizing the effects of information overload, enhances the quality as enabling persons to manage and assess their knowledge by efficient and effective ways, and make use of Knowledge Management/Content Management (KM/CM) tools and approaches which highly abstracted and encapsulated in the units. In this paper, and from the perspective of individual view, these units are proposed as Personal Unit Ware (PUW) which is the conceptual frame work of implementing and modeling the concepts and processes of units.

1. Introduction

Information Age and the new citizenship of human being, establishes a new communication channels which information flow over it .The present era which is dominated by transforming statistics into information and information to knowledge knowing the importance of statistical procedures to collect and analysis of data to infer parameters ,indicators and information which today is the basic material leading to knowledge Receiving, posting, and exchanging messages over these channels effects on information usage and information quality. Two systems are developed to mange these channels knowledge management systems and content management systems. Using Knowledge Management/Content Management (KM/CM) tools minimize the effects of information overload and enhance the quality.

PUW are make use of the principle of Unit based Virtual Architecture (UVA), Open Source; Weblog Content based Architecture, and Social Software. Units are evaluated through usage and quality evaluation procedures. Evaluation methods are essential in assessing and selecting the useful tools and contents, and to avoid falling in the circle of information overload, misuse, and saturation. The paper is organized in three steps, inspection information scope and management ,

The paper is organized in three steps, inspection information scope an management, examining the basic approaches to improve information, and presenting PUW.

2. Preview of Information Scope and Management

This section discusses the theory of information aspects; Usage and Quality, and how to control Usage and Quality using Management, which consists of Knowledge and Content Management.

Information Quality, Information Overload, Knowledge Management and Content Management are forming the quadratic race of information (or content/knowledge) flow. As shown in Figure (1).

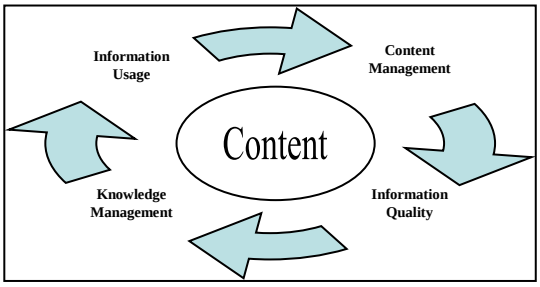


Figure (1) quadratic race of information (or content/knowledge) flow

Information usage needs a powerful content management system to score high quality information

which will exactly fit into knowledge creating/acquiring requirements. Knowledge management activities will produces further

information and emerges more accessing of management tools, and so on. In each milestone content must be available to be feed to serve required tasks. Hence the whole process can be disseminated into two scopes, Information scope and management scope**.**

2.1 Information Scope

Two issues are mostly discussed in information age era, Information Overload and Information Quality. The huge amount of data that are processed daily emerges much irrelevant and fuzzy, unsolicited and junked, flooded and jammed, not useful or harmful, and corrupted information. Wise decision making process is highly depends on how much that information is correct, complete, precise, concise, feasible, and up to date.

2.1.1 Information usage and Information overload

Information overload is caused by too many messages from too many sources [Jam2000] , begins from simple form as everyday news, tasks, lectures and readings, SMS, emails, and Instant Messages, e-media, e-books, manuals, help, web sites ….etc.

Human's ability to read and use information remains constant, just as the amount of information available to us continues to increase, the ability for humans to process this information in a timely and accurate manner decreases. Particularly in business environments, the amount of information one person is responsible for reading and analyzing can be overwhelming .Over the last 300,000 years, 12 exabytes of information have been generated. Within just the last two and a half years, another 12 exabytes have been generated. This year, yet another 12 exabytes will be created [Mic2002].

Identified by Aura [Jas2004], Information overload relates to and is a consequence of how we interact with information. Characteristics of information, such as its vast volume exacerbate the problem of information overload. Our individual differences (e.g. in memory, analytic ability, experience, prior knowledge) enable us to work with vast volumes of information differently, and suggest different points at which information overload becomes an issue. However, information overload affects almost all of us regardless of our capacity for processing information. Aura proposes four three-dimensions of information overload that create practical barriers in our personal and professional lives. The first definitional theme is having more relevant information than can be assimilated. A second theme is being burdened by a large supply of unsolicited information, some of which may be relevant. A third theme has to do with the rate at which we receive information, which may be too high to process. A fourth theme related to the value of information: As the volume of information with which we deal increases, the perceived value of any one piece of information degrades due to redundancy and noise (irrelevant facts which "clutter" the field).

Relevance, unsolicitation, rate and value , have a number of potentially negative impacts as making keeping track of information difficult, putting us under pressure to multi-task, e.g. speaking on the phone while reading and writing email messages, and leads to an inability to focus and losing the index to all of useful information or its links. These impacts can induce feeling of distortion and stress so results an increased tendency to make mistakes and low productivity.

Information overload relates not just to the growing volume of information with which we must all deal, but also to the degradation of that information because of redundancy and noise. We live in a society where we are continually bombarded by media. Everyone must "listen" to a great deal of noise in order to retrieve the few bits of information that are of value to them. Much information is also redundant and must be discarded or ignored for that reason. Trying to clear a path of meaning through the jungle of information is becoming increasingly difficult for all of us. The volume of information has increased so much that we now struggle to keep track of and retrieve for later use those bits of information that we have already identified as being personally useful.

2.1.2 Information Quality

Information that is outdated, inaccurate, or hard to understand would not be very meaningful, useful, or valuable to customer and end users. People want information of high quality that is information products whose characteristics, attribute or qualities help make it valuable to them. It is useful to think of information as having the three dimensions [Jam2000] of time, content, and form. Each dimension has many attributes as follows:

- Time Dimension
  - Timeliness - Information should be provided when it needed.
  - Currency - Information should be up to-date when it is provided.
  - Frequency - Information should be provided as often as needed.
  - Time Period - Information can be provided about past, present, and future time periods.
- Content Dimension

- Accuracy - Information should be free from errors.
- Relevance - Information should be related to the information needs of a specific recipient for a specific situation.
- Completeness - All the information that is needed should be provided
- Conciseness - Only the information that is needed should be provided.
- Scope - Information can have a broad or narrow scope, or an internal or external focus.
- Performance - Information can reveal performance by measuring activities accomplished, progress made, or resources accumulated.

- Form Dimension
  - Clarity - Information should be provided in a form that is easy to understand.
  - Detail - Information can be provided in detail or summary form.
  - Order - Information can be arranged in predetermined sequence.
  - Presentation - Information can be presented in narrative, numeric, graphic, or other forms.
  - Media - Information can be provided in the form at printed paper documents, video displays, or other media.

The major criterion of high quality information is in being relevant, timed, complete, and accurate. In other words, good content makes good information.

2.2 Management Scope

Management is "*The act of controlling production processes and ensuring that they operate efficiently and effectively; also used to direct the design, development, production, and marketing of a product or system.* "[1]

Management is "*effective utilization and coordination of resources such as capital, plant, materials, and labor to achieve defined objectives with maximum efficiency*."[2]

Quoted sentences show the important role of management. One important role of the management information systems (MIS) is to provide the right information to the right person in the right fashion at the right time. In Personal perspective, special software tools are developed as Personal Information Management (PIM), Personal Productivity Software (PPS), and Personal Software Process (PSP) [Ste1996] [Rog2002].

[1] www.iteawww.org/TAA/Glossary.htm
[2] www.ecbp.org/glossary.htm
These two references is retrieved using Google (www.google.com) *'define'* search tool.

Figure (2) illustrates the Data-Information-Decision cycle. The data user applies intelligence over data to produce information that is the basis of knowledge used in decision making by the user. In user perspective; the decision made by high level managers' triggers action within the organization lower level. Such actions produce additional data to be used for monitoring company performance. In turn, the additional data must be recycled within the data-information –decision framework, thus, data from the basis for decision making strategic plan control and operation monitoring [Pet1997].

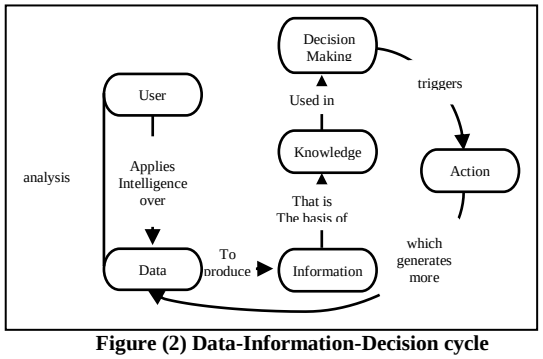


Figure (2) Data-Information-Decision cycle
(Data base system 1997)

2.2.1 Personal Knowledge Management

"*Personal Knowledge Management (PKM) is a collection of processes that an individual needs to carry out in order to gather, classify, store, search and retrieve knowledge in his/her daily activities. Activities are not confined to business/work-related tasks but also include personal interests, hobbies, home, family, and leisure activities. Other definitions also exist another definition of PKM is "a conceptual framework to organize and integrate information that we, as individuals, feel is important so that it becomes part of our personal knowledge base. It provides a strategy for transforming what might be random pieces of information into something that can be systematically applied and that expands our personal knowledge.*" [Eri2001].

PKM tools, by its very definition and nature, are dramatically different from EKM tools/systems. As bottom-up systems, PKM tools can be easily installed by the user on a laptop/desktop/handheld device running a standard operating system (e.g. Windows 95, 98, NT, 2000, XP).

Furthermore, these tools can operate standalone and/or in conjunction with the Internet; they require neither programming effort to configure nor a corporate networking infrastructure to operate, and should be very inexpensive (say less than US$250 per copy) or free.

From an organizational perspective, personal adoption rate of any EKM system may vary enormously. Despite the fact that workers are realizing value in knowledge sharing among peers and the power of collaboration systems (typically enterprise portals, e-collaboration tools, workflow systems), much of the captured/harnessed knowledge is actually "retained" by personal systems (e.g. local drives and directories).

The categories of PKM tools are given below [Eri2001]:

· Index/Search - Similar to the indexing of information hosted on Web sites, these tools index the local or networked drives.

· Meta-search – It is well known that no single search engine is perfect and there are still large amount of information on the Web that are not indexed and hence cannot be located by many search engines

· Associative links – Originated from the information/library services areas and by using pop-up menus or showing hypertext when a document is being edited, these tools act as an online dictionaries, thesaurus or hyperlinks to selective topics on the Web.

· Information capturing and sharing – With the amount of information an
Individual Knowledge Worker (IKW) encounters, it is often necessary to copy and paste (or drag and drop) information from various Web pages or documents to form new documents. Information can be texts, pictures, diagrams, and links to web site and can be stored in various formats.

· Concept/Mind mapping – These are visualization tools that support the capture, organization, and presentation of ideas (represented in the form of concepts and relations).

· E-Mail management, analysis and Unified messaging. Although a very effective and popular communication tool, the number of E-Mail messages that a worker receives has been rising steadily.

· Voice recognition – Unlike the rest of the PKM tools that are nearly all text-based, these tools accept verbal commands as input.

· Collaboration and synchronization – These tools support knowledge sharing (in terms of question answering, discussions and ideas sharing) among groups of people with a common interest in a particular topic.

· Learning -- systems also extend to the learning area. These tools enable knowledge workers to take control of their own learning process and assist by gathering and planning the course modules, conduct the training and track the accumulation of competencies.

Table (1) depicts an alignment of the categories with common knowledge processes.

Table 1 Alignment of PKM tool categories with Knowledge Processes

	Knowledge Process				
PKM tool category	Creation	Codification / Representation	Classification / Indexing	Search & Filter	Share / Distribute
Index/Search			✓	✓	✓
Meta-Search			✓	✓	✓
Associative Links	✓	✓	✓		
Information capturing and sharing	✓	✓	✓		✓
Concept/Mind mapping	✓	✓			
E-Mail management, analysis and Unified Messaging		✓	✓	✓	✓
Voice recognition		✓			
Collaboration and Synchronization		✓			✓
Learning	✓		✓		

2.2.2 Personal Content Management

According to the definition "*Content is the sum of all relevant single information.*" [Wer2001], content comprise both digital and non digital data. However, digital content is understandably the basis for professional content management software. Examples for content are text documents like bills or statements, web pages and page elements such as text, graphics, multimedia, but also applications and programming logic.

According to the definition "*Content management is the process of systematic and structured provision, creation, preparation, administration, presentation, processing, publication and reuse of content.*" [Wer2001], content management is a chain of actions. This is based on the idea of different stages of content - the content life cycle. Below, the stages of the process are further refined, as there are also intermediate steps which will be of interest. The content life cycle comprises the following stages: Creation, Acquisition, Conversion, Editing, Review, Approval/Rejection, Test, and Publication.

However, content management system not only supports the process of content publication but also the integrated storage. There are still other, parallel stages that can be determined: Cataloging, Storage,

Access, Maintenance, Preservation, and Disposal. The onnection of these intertwining process chains is shown in figure (3) [Wer2001].

The content life cycle is a sequential process like any other life cycle. It allows certain stages to be repetitive. The editing-review-approval/rejection combination, for example, can iterate until the auditing person is satisfied with the edited content. Likewise, accessing and maintaining the stored content are highly repetitive stages. Even the disposal does not have to be singular, because undo possibilities offer a restoration of the recently deleted content.

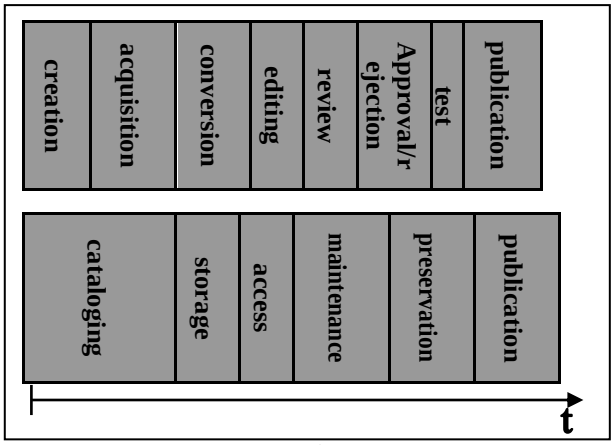


Figure 3 Content life cycle stages

The diverse benefits that the use of content management systems categorized into three groups [Wer2001]:

1. provides an organization wide view of all content in one repository system,
   - This means common and consistent storage and access for all employees, and even for authorized users/customers who demand online access to their statements.
   - The quality of content is increased. The content is up to date and error reduced, as the system scans e.g. for broken hyperlinks.
   - The "time to delivery" is shortened.
   - There is more security through a unified and fine grained access control.
   - The access is being faster and storage space is saved.
   - The unified technical fundament is open and scalable.
   - The separate storage of metadata offers better search capabilities.
2. Separates pure content chunks from their layout information.
   - The system increases re-usability of content for different target publications.
   - Easy updates can be achieved by exchanging layout or content.
3. Integrates workflow features.
   - Activities of team members across the organization can be coordinated.
   - Distributed and controlled authoring is possible.
   - Processes can be rationalized and costs be reduced.

And [Jam2003] summarizes the benefits of Content Management System (CMS) as:

- streamlined authoring process
- faster turnaround time for new changes
- greater consistency
- improved site navigation
- increased site flexibility
- Support for decentralized authoring
- increased security
- reduced duplication of information
- greater capacity for growth
- reduced site maintenance costs

The major components of a CMS are the data repository, user interface, workflow scheme, editorial tools, and output utilities. They allow writers to work in one way in one environment (or several), creating or updating content; editors may use different tools to interact with what the writers submit, and keep track of who's doing what; and the final edited content, still managed in the same repository, can be output in a variety of configurations in a variety of ways (for example, a printed book, and a CD, and a Web site) each of which might have different combinations of the content formatted in different ways but all of which draw from the same database.

A short discussion of each component part paints a more thorough picture of what a CMS is and what it does [Chr1998].

- Data repository. Also called a database, the data repository is the organization of the content to facilitate access, updating, and re-distribution. The format of the information might be SGML or even plain ASCII text. It may be accessed from a local network, intranet, or the Internet, and security to control authorized access must be thought out and included.
- User interface. The set of screens used to interact with the data make up the user interface. Since a CMS is typically an integration of several products, it will utilize several different-but-familiar interfaces, specifically those of Internet

browsers and word processors. Frequently those are used in combination with custom interfaces designed to fit the specific process needs of an organization or publication.

- Editorial tools. Word processors and SGML editors are key components of most CMS solutions. They provide tools that allow content creation and editing, as well as a fluid file form that facilitates the ongoing processing of the content.
- Workflow scheme. With a CMS, we always know what is happening with any given component of the content. The workflow scheme keeps track of each data element, its check-in and check-out history, as well as its version history.
- Output utilities. The output utilities are filters that take information in the data repository and format it for various publishing media. For instance, a filter may generate the CD-ROM version of the content in its final form, but may generate a print version in a partially tagged form to be sent to a typesetter for pagination.

In web perspective; as web content management (WCM) is the major usage of CM; It covers the complete lifecycle of the pages on the web site, from providing simple tools to create the content, through to publishing, and finally to archiving. It also provides the ability to manage the structure of the site, the appearance of the published pages, and the navigation provided to the users. Weblogs and Wiki are simplest WCM tools [Aud2004].

3. Development Approaches

In this section, the approaches of developing and implementing PUW are discussed. Units are presented in multiple definitions to show the required faces. Open Source principles are the soul of the units. It is include benefits of ease of use, transparency, accessibility, low cost, and flexibility. Weblogs and Wiki, content based architecture and social software are the body of units; they are the tools that units could be made by.

These approaches are built together to set up the PUW on the applied platform which the user (person) will use it, access it, fill it with contents, and then disseminate it into various types of media, and hence building up the knowledge over the personal infrastructure.

3.1 Unit Meaning

Looking for the definitions of Unit, the following are the results of Google[3]'s search tool query[4]: "define: unit".

- Standard:

Any division of quantity accepted as a standard of measurement or exchange; "the dollar is the United States unit of currency"; "a unit of wheat is a bushel ;" "change per unit volume"[5]

- Functional entity:

An individual or group or structure or other entity regarded as a structural or functional constituent of a whole; "the reduced the number of units and installations"; "the word is a basic linguistic unit"[6]

- Part of a larger social group:

An organization regarded as part of a larger social group; "the coach said the offensive unit did a good job"; "after the battle the soldier had trouble rejoining his unit[7].

- Single undivided whole

a single undivided whole; "an idea is not a unit that can be moved from one brain to another[8].

- variable size

Archaeologists lay out a grid over a site to divide it into units, and then they figure out which units will be dug. Units vary in size. Archaeologists dig one unit at a time. Keeping track of specific measurements between artifacts and features gives archaeologists the ability to draw an overall map looking down on the site (called a floor plan), to get the bigger picture of the site[9].

- Administrative body

The institution, college, school, department, or other administrative body with the responsibility for managing or coordinating all programs offered for the initial and continuing preparation of teachers and other school personnel ,regardless of where these programs are administratively housed. Also known as the "professional education unit[10] ".

- Execution Environment

A Unit is an Execution Environment which generally runs "client" Operators; that is, those Operators which directly interface with the user[11].

- smallest piece of software

[3] http://www.google.com
[4] Some results are ignored.
[5] http://www.cogsci.princeton.edu/cgi-bin/webwn
[6] http://www.cogsci.princeton.edu/cgi-bin/webwn
[7] http://www.cogsci.princeton.edu/cgi-bin/webwn
[8] http://www.cogsci.princeton.edu/cgi-bin/webwn
[9] http://www.digonsite.com/glossary/sz.html
[10] http://www.ncate.org/search/glossary.htm
[11] http:// www.cs.berkeley.edu/~mdw /proj/ninja/ninja-glossary.html

The smallest piece of software that can be independently tested (i.e., compiled or assembled, loaded, and tested). Usually the work of one programmer consisting of a few hundred lines of source code[12].

3.2 Open Source principle

Open source is a philosophy of software development that makes application code freely available [Mit2002].

Open source is a philosophy of application development that allows code to be read, redistributed, and modified based on the GNU Public License (GPL) formula. The term open source also refers to a loosely organized community of developers dedicated to producing quality software and making it available free or at minimal cost. Although the open-source operating system called Linux has recently garnered the majority of media attention for this movement, the underlying ideas of open-source software development go back more than 20 years to the early days of the Internet.

The overriding philosophy of software development within the hacker community was originally that software must be free (without cost to its users), but this sharply ideological attitude alienated many in the corporate world and slowed their acceptance of software developed by the hacker community.

In 1998 the term open source was coined to replace the confrontational free software label and promote acceptance of this philosophy in the corporate arena. The result has been an acceleration of interest in open-source applications and development by enterprises over the last few years, pushed along by large investments in Linux and other open-source technologies by companies such as IBM, Sun Microsystems, Compaq Computer Corporation, and others. The result is that today many open-source applications are packaged and sold by commercial software vendors. These vendors also provide technical support and customization services for their open-source packages, a critical factor in helping open-source software gain acceptance in the corporate world.

Some of the more popular open-source applications and platforms include:

- **Linux:** UNIX-like operating system gaining popularity in enterprise networks, especially at the server end in niche applications such as Web servers, mail servers, and storage appliances. A popular form of inux is available from Red Hat.
- **Apache:** Popular Web server software that runs on UNIX and Linux platforms.
- **Sendmail:** Simple Mail Transport Protocol (SMTP) server software popular on the Internet.
- **PHP:** Programming language for developing Web applications for the Apache/Linux platform.

MySQL: Structured query language (SQL) database application available from AbriaSoft Company and Nusphere Corporation.

Figure (4) illustrates Content/Knowledge Based Open Systems.

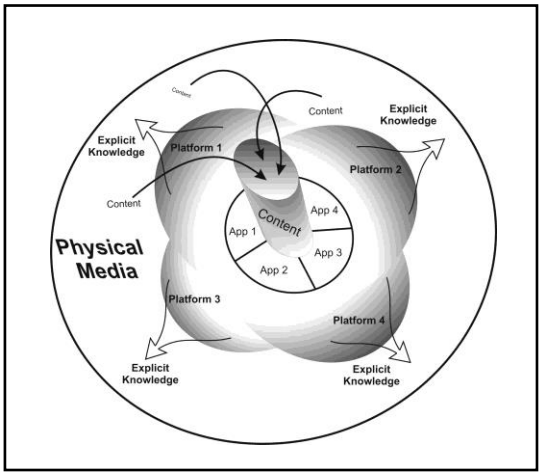


Figure 4 Cntent/Knowledge Based Open Systems
(Introduction to information system Mcgrow-hill)

In content/knowledge based open system, contents are shared among applications that make use of these contents in its way without changing or effecting each other. All these applications can dynamically work in platforms that process the task of the application as a basis to trigger an action. Each task will produce its own knowledge over its specific domain. The whole process is act as qualification of contents to produce explicit knowledge which may be again feed to the system as contents, hence enhancing and increasing the whole knowledge in spiral rapid fashion.

Unit based Virtual Architecture (UVA) is modeled using the principles of virtual units and abstracted tasks. The layers of UVA are demonstrated as follows:

Multithreading/Multiprogramming technologies enable multiple piece of codes to run on one processor, hence each unit of code is virtually has its own processor. Virtual Machine technology enables programs to run independently from physical operating system and platform (for example Sun JVM -Java Virtual Machine- and Microsoft .NET framework). Internet and WEB application are basically make use of Client/Server and Peer-2-Peer technologies to be accessed and operated independently from anywhere, on whatever wares and

[12] http://www.ee.oulu.fi/research/ouspg/sage/glossary

via virtual ports that established to serve a specific task, using various protocols and technologies. eXtensible Markup Language (XML) and technologies of RSS (Rich Site Summery or Really Simple Syndication), Resource Description Framework (RDF), Ontology Web Language (OWL) and eXtensible Markup Language-Remote Procedure Call (XML-RPC) are developed to permits complex data structures to be transmitted, processed, and returned between different operating systems running in different environments. Basically contents are charged to serve a virtual task. Figure (5) is illustrates UVA layers.

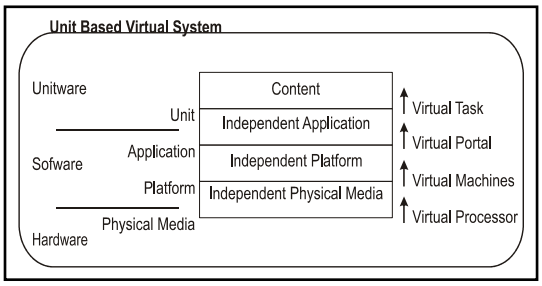


Figure 5 Unit based Virtual Architecture

3.3 Weblog (knowledge log) - Based Content Architecture

Pollard [Dav2003] proposed that business weblogs could be used to codify and 'publish', in a completely voluntary and personal manner, the individual worker's entire filing cabinet. The key advantage of providing such a capability is vastly increased access to, and sharing of, a company's knowledge. This post outlines a content architecture that could enable this to occur.

This architecture would have two principal components: The Enterprise Content Architecture and the Desktop Content Architecture, which are illustrated below. The Desktop Content Architecture would operate as shown figure (6).

The fundamental difference between this and traditional enterprise-wide content architectures, is that knowledge under this model resides with and is controlled by the individual. The knowledge of the community is simply the sum of the knowledge residing in the weblogs of the community members (within any shared categorizations the community members decide to establish, and pushed to other community members by the weblog's 'subscription' functionality. The knowledge of the enterprise is simply the sum of the knowledge residing in the weblogs of all employees, made accessible through the weblog's publishing and subscription functionality, using the tools present in the weblog itself. Theoretically, depending on the robustness of the company's networks, the Intranet could be slimmed down to nothing more than a set of organized links, with no actual 'content' whatsoever.

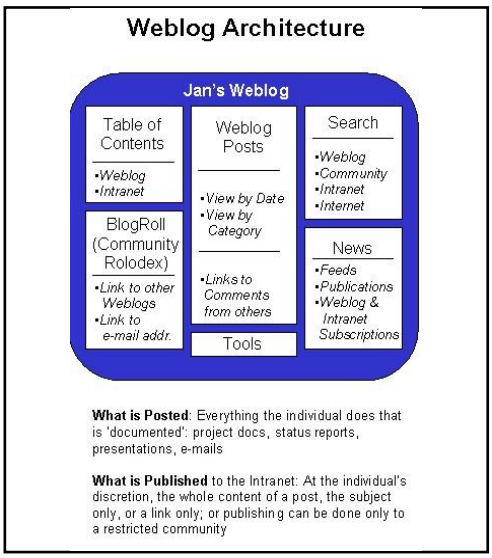


Figure (6) weblog architecture
(Technologies for personal and peer-to-peer 2001)

Each employee thus defines his or her own taxonomy (the same way each employee currently decides how to organize and index his or her own filing cabinet and My Documents folder). Each employee defines his or her own communities (by who is included in the BlogRoll), so communities truly become self-organizing and self-managed.

Culturally, these two features of a weblog-based content architecture are hugely advantageous, because they turn control over the management and sharing of knowledge to individual employees, allowing them to organize knowledge in accordance with their personal mental models (the way *they* think and learn), and allowing them to retain pride in and responsibility of ownership of their personal knowledge 'stocks'.

The advantages of this architecture are therefore:

1. Much more knowledge is codified and available for sharing (including sharing with customers via Extranets)
2. Knowledge is kept more current and complete
3. The context of knowledge is more apparent and hence richer
4. Knowledge is easier to find
5. Less centralized Intranet management and technology is needed
6. Evaluation of individuals' contribution to organizational knowledge is easier to gauge

7. Less effort is needed to persuade individuals to share knowledge
8. Communities of practice can develop spontaneously and flexibly
9. Peer-to-peer knowledge transfer (the most valuable kind in most organizations) is facilitated, and new knowledge is automatically 'pushed' to 'subscribers' on a timely basis

As weblog tools become more powerful and flexible, open sourcing of weblog add-ons increases, and RSS and XML technologies advance and become standard, the justification for migrating centralized knowledge management systems to a weblog-based architecture will grow more compelling. In the meantime, leading-edge knowledge organizations need to be piloting and experimenting with such architectures, if they don't wish to be left behind.

3.4 Wiki and Social Software

A wiki is a script driven website that allows a visitor to edit the content of the page [Jen2003]. Therefore, each visitor can absorb and contribute information. Despite the inherent anarchy of the system, there are several unwritten rules to help maintain order. Adhering to these principles is fundamental to a successful wiki, since they are essential in establishing the communities of practice that create norms**.**

Wiki pages demonstrate a conversational KM solution. Conversational KM has surfaced as a method for organizational knowledge creation, particularly in a virtual team environment. The prospect of several key benefits make these solutions a favorable business option since they are not economically or technologically demanding, are quick to create knowledge and are well suited for decentralized environments The potential of wikis may surpass those familiar conversational technologies presently internalized into business processes, such as e-mail, discussion forums, instant messaging and group decision support systems. In addition, wiki pages exemplify a social software solution whereby individuals are technically supported in aspirations to belong and contribute in a group atmosphere. This type of group participation creates voluntary social connections said to help realize personal goals. For this reason, wikis are being absorbed into many business applications.

Wiki pages mirror physical communities of socialization and information communication, thereby granting tremendous power in an online environment to conversational knowledge creation.

The open source principle, which allows complete freedom and the ability to add, edit or remove any aspect of a web page, makes many people apprehensive. However, current wikis prove that most individuals are not innately malicious, and follow the design rules. The reason for granting users the freedom denied in most web sites can be understood by translating the name. A wiki provides an extremely fast and efficient way to collaborate and communicate knowledge among virtually anyone interested without the constraints of place or time.

Cost savings are not the only justification for open source systems. Open source proponents insist that performance improvements result from the numerous eyes inspecting code and quickly removing errors. The ability for greater customization is also possible, due to the ease of code availability and alteration. These same benefits parallel those possible with wiki pages, which not only correlate to open source systems in ideology, but also first generation wiki code is created in an open source environment.

The importance of a KM system which objectifies subjective knowledge is possible through the collective influence in wiki pages. Persistent knowledge in a wiki page is considered objective since it endured the *open* principle's deletion capability available to any potential critic. One of the founders of Wikipedia[13], the largest online wiki, articulates this concept: "the only way you can write something that survives is that someone who's your diametrical opposite can agree with it". Furthermore, the power of deletion can ensure information clutter is kept to a minimum, erroneous data is quickly removed and knowledge is relevant.

Nevertheless, as with the advantages, the disadvantages of open source systems also transfer to wiki pages. Since first generation wikis are built from open source code, the implementation of such solutions into a business atmosphere signifies unpredictable support and costs. In addition, integration possibilities are also variable and not guaranteed. Many corporations are uncertain of open source licensing and as a result, fear the possible consequences of software implementation. Once employed as a knowledge support tool, the lack of coordination and management can create duplication of knowledge creation efforts. The *convergent* design principle, whereby duplication is removed by discovering and citing the relevant content, should ensure the repetition is removed from wiki pages; however, it does not always function as a deterrent.

The power of wiki applications is being extended beyond KM initiatives to include document retention, project management, employee evaluation, help desk, calendars and much more. In essence, the flexible customization of wiki pages allows them to be molded to fit a specific need; basically, WYMIWYG

[13] http:// www.wikipedia.org

("What-you-make-is-what-you-get"). The dilemma of occupational spam provides a perfect application for wikis to re-instill productivity once offered through email. Occupational spam, a hindrance surmounting commercial spam in many organizations, is excessive cc'ing that may account for 30% of email. The trouble escalates, since these emails must, unlike commercial spam, be at least skimmed. This signifies that if an individual receives around fifty emails daily, greater than four hours a day is spent on email. Alternatively, all pertinent information can be posted to an appropriate wiki page and the information can be stored, updated, refined, searched and quickly referenced, thereby re-establishing the time efficiencies once attributed to email. However, in order to reach these high expectations, managers will still need to inspire the corporate cultural change to surrender power to employees and collapse the hierarchy of control.

4. Personal Unit Ware

The term of "Personal Unit Ware" (PUW) is the conceptual framework to implementing the concepts PPU and PKU. PKU Production Net (PPN) is the PKU production process, accomplished through a grid of tasks which linked to mirror the production, management, and union processes.

Personal Unit Ware are architected using Open Source and Unit based Virtual Architecture (UVA) principles, engineered using web spiral methodology, and implemented by web technologies and tools [Rog2002]. Blogging and Wiki are common applications that used in individual domain to log and share knowledge, beyond the limitations and boundaries of technology and background culture.

4.1 Portable Personal Unit (PPU)

It is standard personal form of functional, moveable, and manageable, software tool, can be integrated with other units to build a larger unit.

The main object of this unit is to serve the personal need of managing information-knowledge/content effectively and efficiently. The personal dimension is the personal perspective of the unit; as the needs are vary from user to other.

PPUs must be easy to use, simple to install and manage, independent of platforms, be plug and play i.e., can be transferred to personal wares[14] without effecting on its function and role, free or not expensive so any one can get it, open sourced so be transparent and extendable to fits the need of the user.

The basic functions of PPU actually are the merge (union) of Personal Knowledge Management (PKM) and Content Management (CM) tools and features, i.e., a collection of processes that an individual needs to carry out in order to gather, classify, store, search and retrieve knowledge/content in his/her daily activities [Wer2001] [Eri2001].

Activities are not confined to business/work-related tasks but also include personal interests, hobbies, home, family, and leisure activities.

The following is the summarized points of PPU:

1. Standard in its scope, domain.
2. Can work (operated) individually.
3. Open interfaced, sourced, accessed in its scope, domain.
4. Pluggable and joinable in order to form a larger unit. The super unit must -at least- have all characteristics of its subordinates.
5. Variable size (volume) due its features and embedded objects.
6. Dynamically can be changed over its operating time.

Examining these characteristics, PPU is suitable for web environment and open systems that security is not very important issues.

4.2 Personal Knowledge Unit (PKU)

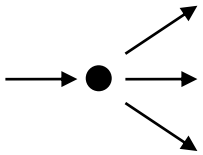
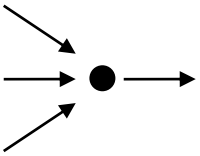
Knowledge is highly depends to the personal perspectives and skills over the personal scope of information. Community knowledge is the accumulated personal knowledge. Standardizing personal knowledge is very important to make the accumulation process simple and free form errors. Following specific rules may waste and confuse user's attention. By using the PPU this problem can be minimized as the tools are highly leveled to the user and -without loosing flexibility- are closed to low level wares of various applications, operating systems, machines and distributed systems. Hence PKU is the fusion of personal content with personal experience over this content, basically, by using Personal Portable Units.

The fusion acts as weaving the content with personal image of content's role/value/properties. The common image is the answer of how, what, when, where, why, who, whom, whose, and yes/no questions. This image can be extended to include the personal memory and view of the specific content. Blogging and Wiki are the essential technologies used to implement the principles of eManara. Table (2) summarizes the PKU view of Blogging and Wiki.

Table 2 PKU view of Blogging and Wiki

	Blogging	Wiki

[14] Personal wares are any of personal assets of hardware or software.

1		
2	Physically (one) Author (writer) Virtually many readers.	Physically many Authors (writers) Virtually one reader.
3	Experience Based (i.e. Subjective)	Content Based (i.e. Objective)
4	The major tasks are EPN[15].	The major tasks are CPN[16].
5	Expands Organizational memory to specific Personal memory.	Extends Personal memory to Organizational Memory.
6	Unique content, multiple experiences.	Unique experience, multiple contents.

4.3 PKU Production Net (PPN)

PPN is a production process illustration. PPN demonstrates the building of PKM from experience (the subject) and content (the object) of a desired matter. PPN consists of four nodes: Matter, Experience (subject), Content (object), and PKU, and of nine tasks (directed links) distributed into three nets: experience production net (EPN), Content Production NET (CPN) and Management Net (MN). MN includes Experience Management Net (EMN) tasks: code-mark-clip, Content Management Net (CMN) tasks: post-construct-qualify, and unite task to produce PKUs.

The whole process begins from the desired matter which represents implicit aim of the user work. The PKU produced is represents the modeling of the knowledge extracted from the matter. Hence the produced PKU is the explicit aim of the user work. Figure (7) shows the PPN illustration.

Thinking and needs are basic source of experience which exploited by invention and search. The explicit experience subjects are managed by coding its forms, marking its indices, and prepare it to clip.

Classification and verification are the basic contention of the object. Unification and organization tasks are used to structure contents. The objectified content is managed through posting and constructing its contexts, hence can be qualified.

The clipped subjects are united with the qualified objects i.e. joining the explicit experience with the structured content. The units are personally built to produce PKUs.

[15] Experience Production Net.
[16] Content Production Net.
EPN and CPN are presented in next section.

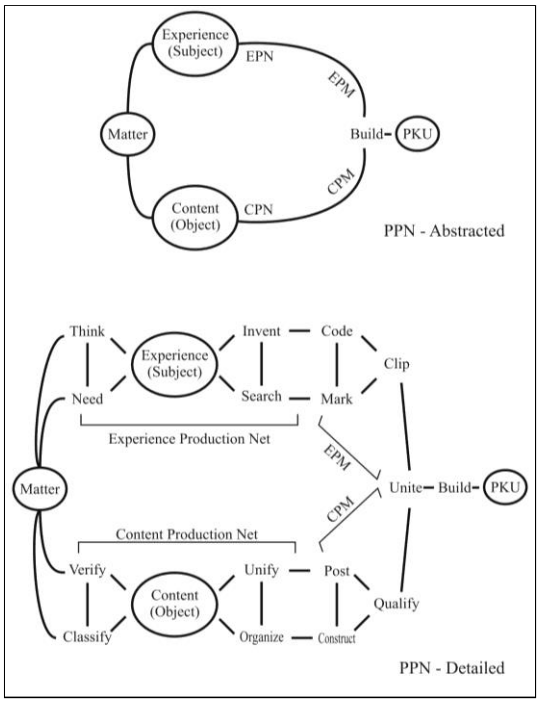


Figure 7 PPN illustration
(Improving data warehouse 1999)

4.4 Evaluating PKUs

To evaluate PKUs, the three dimensions of personal-knowledge-unit must be addressed. Figure (8) shows the evaluation dimensions of PKU.

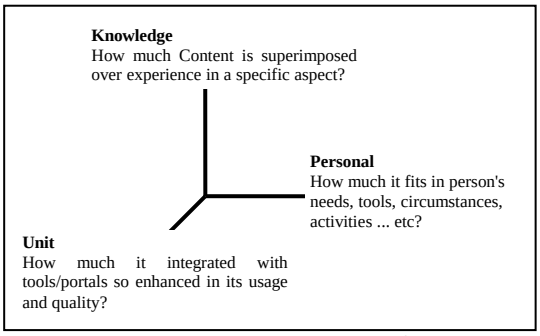


Figure (8) Evaluation dimensions of PKU
(Content management system Journal 998)

For personal scope, evaluation process is stands on personal view and personal background knowledge. Developing metrics to assess the personal domain may be subjected to psychological aspects and heavily varies from one to another, hence evaluating personal scope of PKU beyond the object of this paper.

For knowledge scope, experience or knowing how to use contents is the basic key. Task Oriented Evaluation (TOE) will be considered to give the eagle view of the unit.

Finally for evaluating the units as Integratable parts, quality metrics are considered. There are two

approaches examined, Product and Service Performance/Information Quality (PSP/IQ) Model [Bev2002] and Information Overload evaluating Model [Mun2002].

4.4.1 Task Oriented Evaluation (TOE)

In TOE, three tasks are examined: checking, clipping and posting [Hid2004]. These three tasks are the mapping of the actions over the knowledge life cycle which consists of Create, Store, Find, Acquire, Use, Learn ,Create and so on [Nur2003]. Figure (9) demonstrates the tasks cycle.

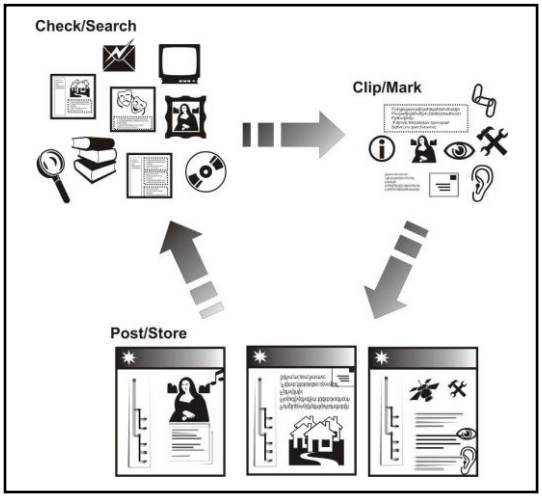


Figure (9) the tasks cycle
(knowledge management intelligence for today 2002)

”Check” means that the user routinely browses particular web sites and information sources. The user does not know ”what” is described at those site exactly but user know ”what kind” of contents included in these sites. These ”what kind” knowledge are important for information distribution so that units should supports the user to present the interest by categorizing or classifying tools.

”Clip” makes shortcut to a content to which the user have strong interest among various contents of ”Checked” sites. ”clip” link presents stronger interest of the user than ”check” link because it points individual content directly. In addition, contents of ”checked” links are changing momentary but those of ”clipped” links are persistent (called ”permalink”). "Permalink" provides that every artifact will get its own permanent Universal Resource Identifier (URI) which must be unique and can be indexed.

”Post” means that the user quotes content, adds some comment, and publishes it as new information. In that case the user presents not only strong interest but her/his personal opinion. In PKU, ”post” type of information publication is made by the PPU tools. TOE will consider these tasks to assess how much the PKUs are usable, effective, and efficient.

4.4.2 Information Overload Evaluating Model

This model has been developed as a tool for the general internet populace to assess how effectively various sites succumb to information overload. The front segment provides various tools to minimize information overload: effective search engines, a good webpage design, and permitting self management policies. The top segment looks at the various mechanisms which effect the degree of information overload – does the information meets the user requirements, is the right amount of information provided, is the quality of the information good, and does the website adhere to first-rate design principles resulting in pleasing aesthetics? If the above mechanisms are taken into consideration, then the degree of information overload would be low. The side block would contain the websites that could be evaluated by looking at the tools and the mechanisms for limiting information overload [Mun2002]. Figure (10) illustrates the frame work of the model.

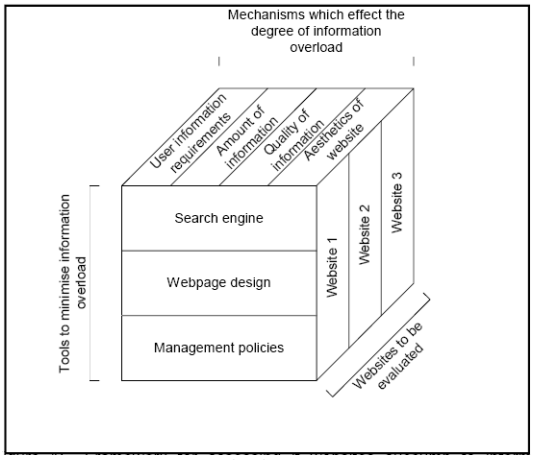


Figure (10) Framework of information overload evaluating model(Management information system 2004)

4.4.3 Product and Service Performance/Information Quality (PSP/IQ) Model

Information quality requires both data definition and data content quality. Data content quality is the degree to which data values accurately represent the characteristics of the real-world entity or fact, and meet the needs of the information customers to perform their jobs effectively [Lar1999]. Kahn et al [Bev2002] proposes the PSP/IQ model to benchmark effectiveness and efficiency. The model extends the criteria of information quality which discussed in [Jam2000]. The basic metrics was classified in three dimensions: time, content, and form. Table (3) illustrates the model.

	Conforms to Specifications	Meets or Exceeds Consumer Expectations
Product Quality	Sound Information • Free-of –error • Concise Representation • Completeness • Consistent Representation	Sound Information • Appropriate amount • Relevancy • Understandability • Interpretability • Objectivity
Service Quality	Dependable Information • Timeliness • Security	Dependable Information • Believability • Accessibility • Ease of Manipulation • Reputation • Value-Added

Table 3 PSP/IQ Model

The details of the quadrant assignments are as follows:

• Sound Information. The Information Quality (IQ) dimensions in this quadrant are tangible and measurable against a specification. The soundness of information is usually independent of task and decision. An information consumer requires information to be error free and well represented. Missing information can lead to incorrect inferences and poor decisions. Consumers must know the conventions used to represent data, whether a date field of 05/03/98 represents May 3, 1998 using American date conventions, or March 5, 1998 using European conventions, for example. Consistent representation ensures a minimum level of interpretability and understandability is achieved.

• Dependable Information. The IQ dimensions in this quadrant generally cannot be evaluated a prior from characteristics of data in a database. Like any service, information delivery can only be evaluated after it occurs. Dependable information is current, secure, and provided in a timely manner to support the task at hand.

• Useful Information. The IQ dimensions in this quadrant are task Dependent characteristics. The information is relevant to the consumer's task and sufficient to support decision making. Information consumers gain greater confidence using objective information.

• Usable Information. The IQ dimensions in this quadrant distinguish one service from another. This can only be evaluated from a consumer's point of view and is based on the task or decision at hand. To use information, consumers must be able to access it and tailor it to their needs. These dimensions depend on the computer systems in place between the consumer and the stored data. Consumers can use the information when it is believable and reputable, as well as beneficial. Benefits are often intangible and difficult to measure, but they are the key to delivering high quality information. For example, an online broker service provides usable and valuable information if investors, in net, make more money using less time than with traditional services. Investment information can be sound, dependable, and relevant to investors without necessarily being usable.

An applied approach is 'cms matrix'[17] which provides a tool for comparing various types of CMSs due to defined criteria.

5. Conclusion

This paper shows how much information overload is critical issue especially in personal domain. The information quality criteria are discussed and classified into three dimensions: Time, Content and Form. The other face of the information technology coin is Management which shown in two forms: personal content management and knowledge management. Both are defined and its tools and lifecycle are discussed to justify the requirements and needs of person.

Making use of Web and IT approaches to qualify information and its forms, score high quality, and gain knowledge from contents, is the goal of the proposed conceptual frame work, i.e. PUW. The encapsulation and accumulation of content and personal experience in an integrated unit (PUW) increase the ability of using, accessing, developing, and understanding of information. This view is implemented through PPU, PKU, and PPN concepts. These concepts are explored and the evaluation procedures are discussed in the paper. As user (person) access the units, new or commented content (information form) are added, hence new information is accumulate and united in the knowledge capital. The resultant unit is attain better information quality, better information use, more effective administration, and accumulate personal knowledge in one repository.

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Key words

[17] URL: www.cmsmatrix.org

KM : Knowledge Management

CM : Content Management

UVA: Unit based Virtual Architecture

MIS : Management Information System

PIM: Personal Information Management

PPS: Personal Productivity Software

PSP: Personal Software Process

PKM: Personal Knowledge Management

PPU: Personal Perspective Unite

IKW: Individual Knowledge worker

CMS: Content Management System

WCM: Web Content Management

XML: Extendable Markup Language

RSS: Rich Site Summery

RDF: Resource Description Framework

OWL : Ontology Web Language

XML- RPC: Extendable Markup Language -Remote Procedure Call

PKU: Personal Knowledge Unit

PUW: Personal Unit Ware

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