Learning Technology

publication of

IEEE Computer Society
Learning Technology Task Force (LTTF)

http://lttf.ieee.org/learn_tech/

Volume 5 Issue 4 | ISSN 1438-0625 | October 2003

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From the editor ..

Welcome to the October 2003 issue of *Learning Technology*.

This issue contains special section on "Meta-Learning Technology", guest edited by Dr Clark Quinn of OtterSurf Laboratories, USA.

The IEEE International Conference on Advanced Learning Technologies, Joensuu, Finland (August 30 - Sept 1, 2004) is coming up as a multitude of events. It will host IEEE 2nd International Workshop onTechnology for Education in Developing Countries (TEDC) (http://www.ctr.columbia.edu/dvmm/tedc/), Conference on Educational Technology in Cultural Context (ETCC) (http://www.joensuu.fi/isvy/contextedutech04/), and also Summer School for PhD Students (http://cs.joensuu.fi/pages/edtech/summer04/). Besides, children (6-16 years) accompanying the ICALT participants can take part in Kid's Club activities for free (details on ICALT website). A business day is also planned for interaction with industry. The website of the event is http://lttf.ieee.org/icalt2004/. The call for paper submissions is available in this newsletter below.

You are also welcome to complete the FREE MEMBERSHIP FORM for Learning Technology Task Force. Please complete the form at: http://lttf.ieee.org/join.htm.

Besides, if you are involved in research and/or implementation of any aspect of advanced learning technologies, I invite you to contribute your own work in progress, project reports, case studies, and events announcements in this newsletter. For more details, please refer author guidelines at http://lttf.ieee.org/learn_tech/authors.html.

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4th IEEE International Conference on Advanced Learning Technologies (ICALT 2004)
August 30 - September 1, 2004
Joensuu, Finland
http://lttf.ieee.org/icalt2004/

*** Important Dates**

February 13, 2004	paper submission
April 19, 2004	notification of acceptance
May 24, 2004	final camera-ready manuscript
May 31, 2004	author registration deadline

*** Proceedings**

All accepted Full and Short Papers and Poster Extended Summaries, will appear in a single volume to be published by the IEEE Computer Society Press. Extended versions of selected papers will be invited for a Special Issue of the Educational Technology & Society (ISSN 1436-4522) journal.

*** Topics of Interest**

Adaptivity in Learning Systems
Advanced uses of Multimedia and Hypermedia
Architecture of Context Aware Learning Technology Systems
Artificial Intelligence Tools for Contextual Learning
Building Learning Communities
Concretizing Technologies (e.g. Robotics) in Learning
Educational Modelling Languages
Educational Paradigms
Information Retrieval and Visualization Methods for Learning
Instructional Design Theories
Interactive Learning Systems
Learning Objects for Personalised Learning
Media for Learning in Multicultural Settings
Metadata for Learning Resources
Mobile Learning Applications
Participatory Simulations
Pedagogical and Organisational Frameworks
Peer-to-Peer Learning Applications
Socially Intelligent Agents

Technology-Facilitated Learning in Complex Domains
Virtual Spaces for Learning Communities

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- Kinshuk, Massey University, New Zealand
- Chee-Kit Looi, National University of Singapore, Singapore

*** General Chair**

- Erkki Sutinen, University of Joensuu, Finland

*** Paper Submissions**

Please follow the submission procedure given at the conference website:
http://lttf.ieee.org/icalt2004/

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Guest editorial

In this information era, the ability to 'learn to learn' is emerging as acritical factor for individual and organizational success. In business settings, innovation is considered one of the key elements of competitive advantage. Book titles such as ‘he who fails fastest, wins’, and ‘the learning organization’ suggest the necessity of experimentation. An important point is to learn from the experimentation. Of course, business are not the only organizations where learning to learn is important, from educational institutions, through not-for-profit organizations, to governments.

At the Meta-Learning Lab (http://www.meta-learninglab.com), we suggest investment in more effective learning has a payoff across the organization and the individual. We’re a group of practitioners who have come together because of our shared interest in learning to learn. One of my primary interests is how technology can play a role in meta-learning.

Learning technology has potential to support meta-learning. As elearning is touted as a component in successful learning initiatives, so we may want to look to technology as a component of learning to learn. In doing so, we must naturally consider the technologies available, but primarily we need to consider just what meta-learning consists of and what can it be.

We are gaining insight into the success factors in learning. We know that self-explanation of worked examples assists. We know that systematicity in exploration helps, sound experimentation strategies assist, and that we can improve individual ability to take advantage of information resources. For each component of the learning process, whether introduction,

concept presentation, example presentation, practice, and reflection, we know strategies that may not be explicit in the materials but that can improve ability to take advantage of the material provided. Affect is important as well, including attitude towards learning, the engagement of the learning material, and adjusting the affect through the learning process. We can explicitly coach these skills, or layer such coaching across other content.

We are also increasingly aware of individual differences, and can profile learners to understand their needs. The areas along which learners can differ, and for which we may find ways to not only assist them but to have them improve themselves, cover cognitive, conative, and affective. Learners may differ on the amount of challenge they can tolerate, how much support they need, and strengths and weaknesses with particular forms of representations. If we know how the content is structured, we can consider how to support learners by providing material optimized for their capabilities (if the need is immediate, say). Alternatively, we can provide content that challenges a learner for any malleable learning skill, and provide supporting material for processing that content, as scaffolding that can gradually be removed as the learner internalizes the support strategy.

We have rich technology to assist us in these goals. We are getting more powerful capabilities of supporting content, context, and user models to allow carefully delineated learning content customization. Learning Object standards provide meta-data around object discovery to support individualizing learning. Mass customization technologies also support us: our user records are increasingly rich and detailed, and we similarly can identify more and more about the device through which the user is interacting with us.

In this issue we wanted to explore what has been done and look towhere we can still go. Cross begins by pointing out the 'business case' for meta-learning, and some suggestions for meta-learning technology. Sharda presents a paper that outlines a high-level meta-learning architecture. Sanchez & Sicilia provide a detailed look at just the sort of models we'll need to implement such architectures. And Dinkelacker provides some practical results from struggles to improve process with technology, a different spin.

These are small steps, but the fact that such initiatives are appearing is heartening. I hope we see more as a consequence as our capabilities evolve.

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A Controversial View of Meta-Learning

Imagine you are the Chief Learning Officer of a successful high-tech firm in SIlicon Valley. You hear about a new eLearning title, "Mavis Beacon Teaches Reading." It takes four hours to complete. It's self-instructional. It's delivered via the web. A learner can take it in small chunks. It guarantees to improve anyone's reading speed by 20%. It costs $39/person. Would you post this course on your corporate eLearning menu?

Of nearly fifty eLearning professionals presented with this question, not a one would put Mavis into their curriculum. Why? Some did not want to insult employees with something so basic. Others were 100% focused on improving business and customer service skills. Reading skills seem trivial in the grand scheme of things; there's so much everyone already has to learn.

Why wouldn't every CLO jump at an opportunity like this? I blame short-term thinking. If my time-horizon is only a week, investing four hours learning in order to save two hours is a losing deal. It's certainly not worth taking the risk that someone up top might brand me as expendable.

Expand the time-horizon to a year, and the economics become compelling. Today's knowledge worker spends at least two hours of every workday pouring over emails, memos, web pages, newspapers, brochures, journals, notes, presentations, and bulletins. That's five hundred hours a year! The reading course guarantees to save a hundred of those hours. At $40/hour per worker, fully loaded, that's $4,000 saved in the first year alone. A 100:1 payback!

Longer term, the value of improving a process becomes apparent. Process improvement is a gift that keeps on giving. But some people simply do not think this way. One person's process is another person's content. To envision a world of processes requires taking a broader perspective. It doesn't come naturally.

Chris Argyris has preached the benefits of "double-loop learning," i.e. improving the learning process, for decades. John Seely Brown told me he is investigating why double-loop learning has never caught on.

Doug Engelbart has dedicated half a century to augmenting human intelligence through process improvement and its derivatives. When I asked Doug what organization best exemplified his philosophy, he replied "None."

I blame schooling for discouraging systems thinking. Questioning the system is not in schooling's DNA. After all, schooling started with rabbis and priests explaining the word of God to illiterate believers. Critical thinking was blasphemy. Shut up and listen; this is God talking.

Two separate groups of college students were given a paper on urban sociology. The first group was told, "Read this. You'll be tested." The second group was told, "Read this. You'll be tested. And by the way, some of this material is quite controversial." The second group scored higher on the test. Why? Because uncertainty engages the mind.

School classes and corporate training would be more effective were learners initially told "This is our best thinking. It might be wrong. How do you see it?" That's a meta-learning tactic that would improve results without adding costs. You could preface all eLearning with a reminder that learners should look for ways to improve the content, drop thoughts in the electronic suggestion box, and that they organization is always on the lookout for ways to improve its service. Positioning a learning event as inquiry instead a recounting of someone else's truth puts a touch of humanity back into eLearning that's often sterile.

Getting the concept of meta-learning to take hold requires acceptance that nothing is set in stone. There are no givens. The world is uncertain. Everything is relative. People can learn to learn better by taking a long term view in which learning answers the inevitable query of "What's in it for me?"

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Meta-learning with Semantic-web Technologies

Meta-learning, i.e. learning to learn, can unlock the hidden potential of learners.Meta-learning systems that make effective use of Web technologies are needed to keep pace with the demands of the 21st Century. *Meta-learning Architecture with Semantic-web Technologies Enabled Resources* (MASTER) is a conceptual framework for applying Semantic web technologies to meta-learning.

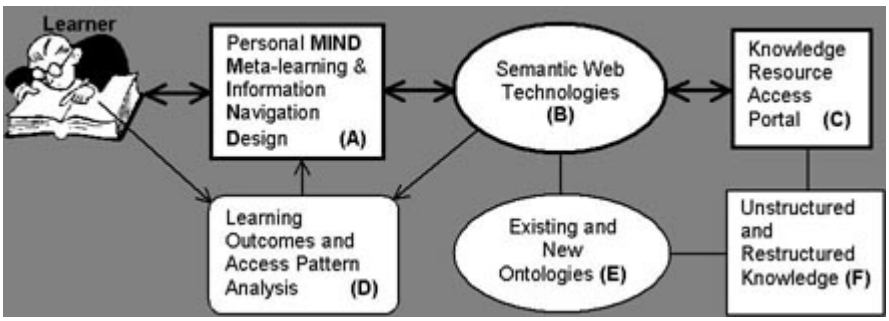

Figure 1: Meta-learning **A**rchitecture with **S**emantic-web **T**echnologies **E**nabled **R**esources (MASTER)

Semantic web

While the current Web provides a vast repository of resources for learning, it fails to exploit semantic linkages between the information stored. The concept of Semantic web was proposed as “an extension of the current one, in which information is given well-defined meaning, better enabling computers and people to work in cooperation” [1]. One of the main aims of the Semantic web is to provide techniques to represent both data and rules for knowledge extraction, and thus, “assist the

evolution of human knowledge as a whole" [1]. Therefore, the Semantic web is a suitable environment for meta-learning. However, to use the Semantic web effectively for meta-learning, first the process of meta-learning must be modelled for the individual, and then implemented using web-oriented tools and techniques to access knowledge resources; as shown in figure 1 – where the main components (A, B & C) are shown in bold, and support components (D, E & F) below these. Learners access various knowledge resources via an access portal (C) using Semantic web technologies (B). Ontologies (E) support knowledge interpretation. Learning outcomes and access patterns are analysed (D) and the results fed into the Meta-learning component (A).

Meta-learning

We need to recognize that meta-learning is a very individualistic process. Individuals must discover the learning styles and patterns most suited to their personality, and then support the system in developing a personal *Meta-learning and Information Navigation Design* (MIND). This personal MIND embodies knowledge of how a person navigates through information, takes notes, finds further references, and accepts or rejects information obtained.

Learning styles

"Students learn in many ways – by seeing and hearing; reflecting and acting; reasoning logically and intuitively; memorizing and visualizing by drawing analogies and building mathematical models; steadily and in fits and starts" [2]. A systematic description of these learning styles constitutes a learning style model. A number of learning style models are used widely, including: Myers-Briggs Type Indicator, Kolb's Learning Style Model, Herrmann Brain Dominance Instrument, and the Felder-Silverman Learning Style Model [3] – which classifies learning styles over five dimension; each with two options, as shown in table-1. Most individuals use a combination of these learning styles. However, individuals tend to have a dominant learning style on each dimension, depending upon the individual's personality.

Learning Dimension	Learning Style-1	Learning Style-2
Perception	**Sensing:** Concrete and practical, oriented toward facts and procedures.	**Intuitive:** Conceptual and innovative, oriented toward theories and meanings.
Input	**Visual:** Prefer visual representations – pictures, diagrams, flow charts.	**Verbal:** Prefer written and spoken explanations.
Organisation	**Inductive:** Prefer presentations that proceed from the specific to the general.	**Deductive:**Prefer presentations that go from the general to the specific.
Processing	**Active:**Learn by trying things out, and working with others.	**Reflective:** Learn by thinking things through, generally working alone.
Understanding	**Sequential:**Linear and orderly, learn in small incremental steps.	**Global:**Holistic and system wide thinkers, learn in large leaps.

Table 1: Learning Dimensions and Styles in the Felder-Silverman Learning Style Model

Learning patterns

The concept of *patterns* is used to describe the core of the solution to the problem of interaction design [4]. A pattern describes a problem that occurs repeatedly, and the essential elements of the solution to that problem. For meta-learning, the user needs to determine the learning pattern best suited to the individual's learning style, and build a personalised MIND that can make good use of Sematic web technologies. This personalized MIND shares some functionality with learning management systems [5].

Building ontologies

Semantic web comprises technologies used over the current web, augmented with techniques for creating sematic linkages between the information content. One of the core techniques for doing this is the development of ontologies, which are "explicit formal specifications of the terms in a domain and the relations among them" [6]. Some ontological libraries such as Ontolingua and DAML can be used directly, if suitable. Where a suitable ontology doesn't exist, one can develop a new one by analysing the domain knowledge and taking the following steps: determine the domain and scope of the ontology; enumerate important terms in the ontology; define the classes and the class hierarchy; define the properties of classes; define the facets (also called slots) of these classes; and create instances of these classes [6].

By using these ontologies, unstructured information on the web can be restructured to generate knowledge that the users can interpret unambiguously. These techniques, when applied to the Semantic web, enhance learning outcomes. Nonetheless, they can support meta-learning also, as they can help a user investigate the efficacy of various learning patterns and arrive at the most suitable one.

Conclusion

The MASTER architecture aims to discover the learner's preferred learning pattern, by matching the learning style with data such as, information sources accessed, references linked, notes recorded, and, as a consequence, the enhancement obtained in learning outcomes. This data is first analysed to formulate a model of the individual's preferred learning pattern, and is then used to improve the personalized MIND in two steps:

1. Compare the improvement in learning outcomes of different learning patterns, and

2. Shift the personalized MIND's information access and processing policies towards the more effective learning patterns.

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Expressing meta-cognitive pre- and post-conditions in learning object contracts

Introduction

Intelligence can be considered metaphorically as a toolbox, whose content and quality is not only determined by the biological substratum but by acquired cognitive strategies [Snow & Lohman, 1984]. In consequence, it can be considered that digital learning contents and interactions – i.e. learning objects in a general sense – may require or contribute to acquire to some extent some specific cognitive skills. A very common specific case of such elements is that of a learning object that is designed to help students to acquire the cognitive strategies to effectively learn in virtual settings [Souza el al., 2000]. These requirements and outcomes can be specified through current learning object metadata specifications, but the achievement of the full machine understandability required to the (semi-) automation of learning experiences calls for stricter specifications. One approach to such is the design philosophy of *Design By Contract* (DBC), originated in the software engineering community [Meyer, 97], and that has been applied to learning object metadata in recent works [Sicilia & Sánchez, 2003, Sánchez & Sicilia, 2003].

In this paper, we describe how meta-cognitive requirements and outcomes can be defined in terms of learning object contracts, enabling their retrieval and selection by software modules prepared to understand the semantics of pre- and post-condition clauses.

Expressing requirements and outcomes regarding meta-cognitive skills in learning objects

Applying design by contract to learning objects consists in specifying a formula in the form *{C}LO{O} [θ]* for each learning object, this meaning the following: using the learning object LO in a learning context *C* – that includes a description of a specific learner profile – facilitates the acquisition of some kind of learning outcome *O* to a certain degree of credibility *θ* [Sicilia & Sánchez, 2003]. This clause uses preconditions (*C*) and postconditions (*O*) allowing the learning object designer to define formal contracts that represent the behaviour of an individual object in a learning object system. In a repository containing learning objects defined by such these contracts, deciding whether an object is appropriate for a particular learning objective or not is primarily based on the outcomes the object is intended to produce (postconditions), but once the learning object has been chosen, and before it can be used, preconditions (i.e. prerrequisite) accomplishment is also required.

In previous works [Sicilia & Sánchez, 2003, Sánchez & Sicilia, 2003] we have proposed the following syntax to write learning object contracts:

rlo <URI>
  require
    precondition1
    precondition2
    ...

  ensure
    postcondition1
    ...

provided that both pre- and post-conditions are expressed in the way of assertions and according to the syntax:

[level] preconditionId.element <relationalOperator> requestedValue

postconditionId.element <relationalOperator> value [θ]

where *pre-* and *post-condition identifiers* correspond to either the learner (lrn), or the learning context (ctx), or the system where the learning object is due to be executed (sys); *element* maps to a LOM element entry (see Table 1); and *level* indicates the strength of the precondition (mandatory, recommended or optional).

LOM element	Description	Element	Level[1]
5.1 Interactivity type	Predominant mode of learning in the user side.	interactivity	mandatory
5.5 Intended end user role	User role the learning object is designed to.	role	mandatory
5.8 Difficulty	How difficult or hard is to work with the LO for the intended audience.	ability	optional
5.11 Language	Human language used by the user of the learning object.	language	recommended
9.2 Taxon path	Taxonomic path in a specific classification system.	knows	recommended mandatory

Table 1. Learner assertions.

Our aim here being to define metacognitive requirements and outcomes in terms of learning object contracts, we will focus on learner assertions.

Metacognitive requirements on the learner's part have to do with specific skills that contribute to improving learning results. If we assume that a taxonomic path has been defined for metacognitive requirements, we will be able to write requirements of this kind in the form of preconditions —metacognitive preconditions— by using the syntax element "knows" in Table 1. Consequently, before a learning object whose content is aimed at improving some metacognitive skills can be used, metacognitive preconditions defined in the object contract must be assured.

Metacognitive goals, on the other hand, represent the achievements that a learner acquires after using a learning object as the aforementioned. Again, assertions can be written in the form of postcondition clauses in the learning object contract. Unlike preconditions, learning object outcomes are ensured to a certain degree of credibility θ that, for metacognitive goals, can

range in a percentage scale from 0 (dubious) to 100 (fully reliable). It is important to consider that outcomes always fall into two categories: *absolute* outcomes —understood as measures of metacognitive skilfulness—, and *relative* outcomes —understood as an increment of the learner's metacognitive skills before using the object—.

Example Specifications

For the sake of illustration, here we provide several pre- and post-condition examples regarding technical student's metacognitive skills. These skills were subject to analysis by [Veenman & Verheij, 2003], who rated metacognitive skilfulness 0 to 4 points on five subscales: orientation activities, systematical orderliness, accuracy, evaluation, and elaboration activities.

Applying DBC to modelling metadata information about a simple learning object aimed at helping spanish students to improve the quality of their planning activities by interactively completing an orderly sequence of actions on solving maths problems, the object contract —obviating context and system assertions— would be:

rlo <http://... /simpleMathProblemSolvingImprover1>
require
mandatory lrn.language = es
mandatory lrn.interactivity = active | mixed
mandatory lrn.role = learner
mandatory lrn.ability >= medium

ensure
lrn.knows (systematical_orderliness > 2) [70]
lrn.knows (accuracy) > $\text{lrn.knows}_{(-1)}$ (accuracy) [90]

Here the learner's language must be spanish, while the predominant mode of learning in the user side has to be either active or mixed, but active is preferred. Holding these preconditions, the object ensures that a) the learner will most likely (70% of credibility) end up having a systematical orderliness score over 2 points in the aforesaid scale, and; b) the learner's accuracy will increase with a confidence level of 90%. Note that the contract doesn't constrain any learner's prior metacognition skills.

Design by contract allows the learning object designers publishing more than a contract for a given object, each one stating diverse prerequisites and ensuring different achievements. In our example, a weaker contract —understood as one defining more relaxed preconditions— could have been written as:

rlo <http:// ... /simpleMathProblemSolvingImprover2>
require
mandatory lrn.language = es
recommended lrn.interactivity = active
mandatory lrn.role = learner
lrn.ability = any

ensure
lrn.knows (systematical_orderliness) >
$\text{lrn.knows}_{(-1)}$ (systematical_orderliness) [50]
lrn.knows (accuracy) > $\text{lrn.knows}_{(-1)}$ (accuracy) [50]

Under the new circumstances, the object obviously cannot ensure the same goals provided that now the learner requirements are weaker. Focusing on postconditions, systematical orderliness achievement can only be guaranteed to increase, while the former contract used to ensure a systematical orderliness over 2 points. Same thing happens to accuracy. Lower confidence levels on this new contract can be explained from the fact that it becomes more difficult to ensure the outcomes when not even a minimum ability degree is required.

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Placing Our Stuff So We Can Find It Later: A Meta-Learning Essential

Abstract: Learning from our previous work is often inhibited by difficulties in finding relevant materials after a period of time and, when found, making sense of them. Presented here are several practical approaches for alleviating this difficulty. The suggestions are (1) craft meaningful, contextual file names; (2) place things where they can be easily found; and, (3) relentlessly discard useless items.

It is widely accepted that meta-learning is a matter of acquiring skills. This paper suggests how three specific skills related to using computing technology can be improved, thus enabling enhanced learning for these populations. Following this discussion, the paper will link back up with a meta-learning perspective on the value of improving these skills.

Knowledge workers seek information in order to produce information. One meta-learning aspect of being efficient at producing information assets is being able to find related materials in both the short- and long-term. In work environments, information assets that were crafted previously could often contribute to a task at hand: If only the right things could be found at the right time.

While it is valuable to learn from mistakes, it is wiser to learn from success. By being able to access our previous work, we foster opportunities to learn from our experiences and subsequently produce improved assets. By being cognizant of how we produce information, subsequent seeking by future readers can be more fruitful, especially when it's our own work group.

This article advocates engaging in a few seconds of forethought when naming and storing files, and relentlessly disposing of trash. It takes a minute now; saves hours later. This advocacy derives from decades of the author's experience managing teams chartered to produce myriad information assets Ð- articles and presentations, media programs, research analysis and reports, and software applications. The typical challenge wasn't accomplishing the work at hand because the staffs were always highly competent, but instead establishing ways of working together in an *effective* manner such that the work product, and its inevitable spin-offs, could be made readily available at some subsequent time.

The recurring observation is that teams often start work from scratch because earlier work is unknown, or if discovered, is too hard to decipher. Viewed differently, users often don't know today what they knew yesterday, mainly because they manage their information assets in a way that does not necessarily lead to easy recognition and recall at some future time. Instead of remembering, or being able to quickly find related materials, projects often commence *tabularasa*. For collaboration amongst people, especially as personnel change and tasks morph, the manner in which items are named and stored can greatly impact group performance, especially when a task today could benefit from acquiring some fragments of a work done a while ago.

The underlying premise here is that the clerical tasks associated with producing information assets is drudgery, and ignored as often as possible by most people. Moreover, there tends to be a sense of excitement - of immediacy - in starting a new project. People want to "get on with it" and not sift through sundry files stored every which where. Consequently, not much learning is evident when the general mode of initiating production is *tabularasa*.

Anecdotal observations suggest that computer users can learn to improve their skills in a minimal amount of time. Yet, because many are self-taught, they often have approaches that are less than optimal and not conducive to collaborating effectively with others. By adopting a few simple rules numerous problems can be obviated long before they might occur. Moreover, it enables work done today to better contribute to work to be done tomorrow.

Individuals devise myriad approaches for storing and archiving materials. Such methods, however, are often idiosyncratic and become unworkable once it becomes necessary to collaborate. What works for "me" rarely works for "us." Familiarity, and at times the politics of hierarchy, can fashion how information assets are named and stored, typically without a second thought to making things easy for subsequent usage. Several common sense rules can greatly simplify handling information assets, and make them more valuable in the future when they can be used either as part of producing new information, or as reference material.

People are often pack rats with information, especially computer files. We excel at storing things, perhaps even hoarding them; yet finding the information we seek at some future time can frequently become a tedious challenge. Why? The reasons are myriad, but poorly chosen file names, scattered storage locations, and keeping too many trash files in the mix, is each a significant contributor to the frustrations. Once the information has been created and stored, often it's as good as gone from future utility. One practical approach is to keep things simple, and in context, from the outset of a project.

Things To Do

Consider an analogy to a flock of birds turning together in flight. This beautiful feat of coordination and cooperation can be modeled with just three simple rules [see note 1]. Likewise, collaborators can work much better together -- and be prepared for the better performance in the future -- by just adopting three simple rules when creating their information assets:

1. Craft meaningful file names that don't become opaque after a short while;
2. Place items in easy to identify and scan locations;
3. Prune clutter relentlessly.

Craft Meaningful Filenames

Use file names that are simple yet informative enough that when looked back upon a year later, they have some real meaning: Not too long, nor too short. Remember that the file has its own attributes such as the date. Also, keep filenames clear of lettering that states the obvious (e.g., no need to spell out "version" when any reader would recognize it as a version. If the files are related to a project, use enough of the project name that it's easy to recognize it later. File suffixes can often indicate the type of file, but not everyone has their computers set to display these so that may be useless.

Below is an example related to the exciting new Gizmo project for the wonderful Pluto Partners.

Item	Good Example	Bad Example
Proposal v1	Pluto_proposal-v1	Proposal1
Final Proposal	Pluto_proposal_final	Plufinal.doc
Presentation draft #3	Gizmo_preso-v3	Giz-version3-7jan04
Gizmo final specs	Gizmo-specs-final.xls	Pluto gizmo project specifications final.xls

Hint: Using underscores and hyphens instead of spaces in the name makes it easier to eventually post these files to the Internet or a company's intranet, making the materials more available for a broader audience.

In each case in the above table, a name was crafted that was neither too long nor too short. Each is informative, will sort well, and require no additional information to know what it was and what it was about. Keep this simple by naming the file in terms of:

1. what it is related to -e.g., "pluto" or "gizmo";
2. what type of material it contains -e.g., proposal, preso, brainstorm; and,
3. what the "state" is -- e.g., "final," "v3," or "rough."

These three bits of information provide context that enables a reader to immediately recognize the project, the type of asset, and its state. This will be highly useful data once short-term memory about the project fades. A rule of thumb is to avoid naming a file as "final" until it is. When a file is finished, just change the name of the most recent version to "final" It's not a good idea to have any drafts of files named "final"

Place Files Where They Can Be Easily Found

As a general approach, place files where they can be found now and located later. With the familiar metaphor of folders and files: Is it better to have just one folder and put all the files under it? Sometimes. Is it better to have an elaborate hierarchy of sub-directors broken down to highly-detailed granular levels. Sometimes. But what's best is to organize folders such that there aren't too many, nor too few - neither too deep or too shallow. This means striking a workable balance between how "perfect" or "accurate" the categories of the subfolders are, vs. how easily people can use them, including going back and finding things later. One observation is to add structure and new subfolders later rather than earlier. The human brain is highly adept at scanning lists and noticing what's relevant, and the clerical tasks of always placing or finding files inside deep hierarchy can be irksome. Bet on the brain to make sense instead of the hands to always have to be clicking and moving files.

Some suggestions (using meaningful naming for folders as well):

1. Have a top folder name designating the project (e.g., Gizmo) [see note 2];
2. Maintain as few sub-folders as needed - every time a folder gets perhaps one or two dozen entries, subdivide what make sense (e.g., perhaps by types -- presentations, code, brainstorms proposals, spreadsheets), and dispose of whatever isn't absolutely critical
3. Keep a subfolder in each project for old and inactive materials: e.g., drafts, brainstorming notes, previous manuscript versions or various component files, etc., and be vigilant about moving files into it that haven't been used in a few days or so

For a team, common repositories are the best idea: e.g., intranet, shared drives, network storage, collaboration spaces, etc. [see note 3]. Avoid email attachments whenever possible when working with others on a project. Use them only as a last resort. Such practices may seem convenient at first but inevitably lead to a plethora of related versioned files, spread across the mailboxes of numerous team members, each of whom typically has an idiosyncratic means of handling assets. Without a centralized repository, when a project is done files that may be important to future readers are likely distributed every which where making it difficult to establish a common archive.

Prune Clutter Relentlessly

Sooner or later a project, or a major project phase of it, becomes history. One extremely valuable activity is to go through the files, keeping only those that are absolutely essential - not those that that "might be needed someday." (They most likely won't be.) This necessary task is easy if the clutter is pruned on a regular basis. There's no need to hold on to multiple copies of file drafts - perhaps the first one, and one or two in between with valuable client edits or suggestions, but not too many. This clutter, when faced at some future time, can create an overwhelming clerical task of sifting through it, which means the materials won't get used - and tabularasa will result. It's better to not encounter this situation at all. Prune clutter relentlessly.

Things Not To Do

Earlier was a list of three simple rules that could foster better long term learning in the crafting information assets. Here is a companion list of things NOT to do.

1. Don't establish a broad over-arching policy on naming and storage (i.e., trust the group to pick good names)
2. Don't expect large-scale content management systems to suddenly solve all the problems;
3. Don't sit and argue about the naming and storing conventions, unless it is to make them drastically easier to use.

Avoid Comprehensive Naming Policies

The problems with establishing a broad overarching policy on naming and storage are uncountable. What's important is that a work team finds a simple way of working together where the production of the information assets is the objective, not creating the most elegant naming convention. The latter is nigh impossible because things do change, and a broad policy will rarely fit. This means that much of the time that was spent on crafting elaborate naming policies, in the end, will have been wasted [see note 4]. In a work group, come up with straightforward names Ð quickly -- and stick to them.

Avoid Large Scale Content Management Systems

Unless an organization is faced with needing to track and maintain a repository of large numbers documents (e.g., many hundreds or more) or for legal or regulatory purposes, a content management system can often be pricey overkill. Of course, in specific cases such systems are valuable and necessary, but for many work groups, what's needed is just an agreed upon set of names and locations as to where to store things, *for the current project* [see note 5]. All too often, a complex content management system can become an extra set of clerical tasks that people must learn and it can tend to focus people's attention on "what they are working *with*, instead of what they are working *on*." [see note 6]. It's better that their effort be focused on the work product, not the technology supporting the work.

Avoid Quibbling Over Name/Location Fine Points

It's all too common for work teams to become entrapped in useless quibbles about issues such as names [see note 7]. What's most important is to have a simple approach that works "good enough." Although the naming approach for a project is of course imperfect, such situations can become a convenient opportunity for some people to focus more on their rhetorical proclivities than finishing the task at hand. For the manager, pick an approach and stick with it for the project's duration. Wait for the next project to upgrade the approach. Show leadership. Keep the main thing, the main thing [see note 8].

Wrapping Up A Project or Phase

Projects have natural breakpoints. These may be driven by dates (e.g., a paper deadline, executive council presentation schedule, etc.) or by resources (e.g., budget expires, personnel departing, etc.). Before moving on to the next project (or even the next phase), go through the project folders and discard as many items as feasible (i.e., choose to discard more than less). Write a brief note about the folder's contents and put it in the top-level project folder. If possible, archive them together, using a meaningful name (e.g., gizmo_phase1_archive) [see note 9]. Put copies in safe places, and discard all the single files and folders.

Ties With Meta-Learning

We've observed that the skills advocated above can aid individuals on a work team to become more efficient. More importantly, the team itself can become noticeably more productive, especially in terms of learning from its past work and being able to incorporate past work product into current activities. Taken together, these skills address how to better use some basic tools of knowledge workers. As such, the general notions of "how to name" and "where to place" materials supercede any particular instance of technology. Technologies can readily change, but a mindset of effective naming and placing can transcend any particular technology, application, or program.

Naturally, the three skill refinements mentioned in this article are but a small selection of the many relevant ones in a broad suite of information production skills. As information technology continues its relentless advance, especially as it becomes more and more of an expected infrastructure wherever people work, it will become progressively more important that people refine their learning to concentrate on what they're working "on" instead of "with." Whereas new computer programs will continue to appear, and older ones will continue to have numerous enhancements, it is important that people not focus on the software they're using, but on how to effectively complete the task they've undertaken. Notions about "how to use a database" are much less perishable than skills of "how to use Gizmo Database 2.1."

While there is a fine line between mastering a tool and mastering the process of using a tool, with information technology it's somewhat more important to focus on general principles instead of specific elements of how a particular instance of software operates, because the latter changes regularly. The more refined understanding a person has of general principles about how to use certain classes of tools (e.g., spreadsheets, code editors, databases, word processing, etc.), the faster learning of new and upgraded software can occur, and the greater their productivity will become for them and their teams.

Summary

This practical approach is advocated a method to aid subsequent learning, especially in regard to team members learning from their previous work when crafting information assets. Several suggestions are presented describing: (1) meaningful file names; (2) simple organization of storage; and (3) pruning clutter. By keeping a concise note in the main folder about the general contents of the archive, people can find things later. Also, computer-aided tools for search and retrieval can be brought to the task when appropriate.

Notes:

1. The three rules deal with (1) separation; (2) alignment; and, (3) cohesion. See Reynolds, Craig. (1995) "Boids." http://www.red3d.com/cwr/boids. Also see: http://www.brunel.ac.uk/depts/AI/alife/al-boids.htm
2. Organize things in terms of what's most important to the task at hand - perhaps the top folder is best the name of a project, the name of a client, or some such. Just be consistent.
3. These may be network-based such as shared public folders, an organization's intranet, or various commercial products/services that provide for this such as SharePoint or eRoom.
4. Naturally, in some instances in certain organizations comprehensive naming conventions are necessary. Groups

focused on tracking legal cases, investor relations, tracking drug trials, and the like certainly need highly formalized procedures. But that is not the target of this article. Here, the focus is on the small workgroup in their preparation of materials, often long before they become formalized.

5. Content Management Systems come in all sizes and flavors. This article is not critical of their significant capabilities or contributions, but the fact remains that in many work groups, such a system is costly to set up and maintain, for some users can be daunting, and puts more focus on the tools than the products of the tools. Two notable CMSs are the Open Source one known as Plone (http://www.plone.org) and the commercial product offered by Documentum (http://www.documentum.com). Both are exceptionally powerful approaches for content management. Whether such a system provides a reasonable cost/benefit for any particular usage is best carefully reviewed on a case by case basis.
6. Distinguising between "working with" and "working on" was a remark made by Terry Winograd at the IBM Almaden "New Paradigms Using Computers" Annual Conference, 2001.
7. For a disheartening exposition of how complex naming and its associated staff quibbles can undermine effective organizational performance, see "The Curse of Xanadu," *Wired* June 1995. http://www.wired.com/wired/archive/3.06/xanadu_pr.html
8. Jim Barksdale, CEO of Netscape Communications, guiding message to employees: "The main thing is to keep the main thing, the main thing." 1995.
9. Pick your preferred tool. Some familiar ones are tar, stuffit, winzip.

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Development and evaluation of a Web-based environment for supporting office automation courses in undergraduate journalism and mass communication studies

Abstract: This paper presents a web-based environment that was designed and implemented in order to support the office automation courses of the Journalism & Mass Communication Department, at the Aristotle University of Thessaloniki, Greece. The main sections of the environment are described, in addition to their functional integration to the teaching and learning process. Finally a formative evaluation is presented along with useful conclusions.

Introduction

Web-based teaching tools are commonly used in distance learning applications, but they also provide an opportunity to significantly enhance on-campus learning (Ausserhofer, 1999; McCreanor, 2000). An important technical development relating to computer communications in education involves the linking of a Web-compliant (i.e., accessible via a Web browser) user interface and Web-compliant tools and applets with an underlying database. Thus, a new type of system called course-support environment appeared (Collis, 1999; Copinga, Verhaegen & van de Ven, 2000). In this type of system a data-base is integrated with Web-based tools and applications, and used to generate a course-support environment accessed via a standard Web browser.

Since the beginning of 1998, the Media Informatics Lab (http://pacific.jour.auth.gr) of the Department of Journalism & Mass Communication (J&MC), at the Aristotle University of Thessaloniki (AUTh), Greece, started to develop and publish material on the Web for its conventional courses (Veglis, 2000; Veglis & Barbargires, 2001). The purpose of this effort has been mainly the support of the office automation courses and the preparation of a future distance-learning course. In the following, we present this course-support environment, along with the special considerations that determined its design.

Course-related considerations

The office automation (OA) laboratory courses are offered to the second and third semester undergraduate students of the J&MC Department. The students have already attended during the first semester an introductory computer science lecture course, which also covers the MS Windows environment, along with basic Internet services. The OA courses are taught in weekly three-hour lessons that combine both lectures and computer practice and take place in the computer laboratory.

Environment description

Technical aspects

For maximum flexibility, we chose to design and build the course-support environment using the available servers and targeted at the specific needs of the students. The MS FrontPage (FP) 2000 of the MS Office 2000 Premium edition was used as the Web authoring and management software. For the design of both the individual Web pages, and the entire Web site as well, various well-known Web usability rules were taken seriously into account (Nielsen, 2000). In this context, special consideration was given to the overall simplicity of the Web pages and the site navigation. The Web page size was kept to a minimum in order to achieve small response times, and each page can be reached within three clicks from the Home page.

Content description

The main sections of the web site are shown in Fig.1 and their contents are described in the following.

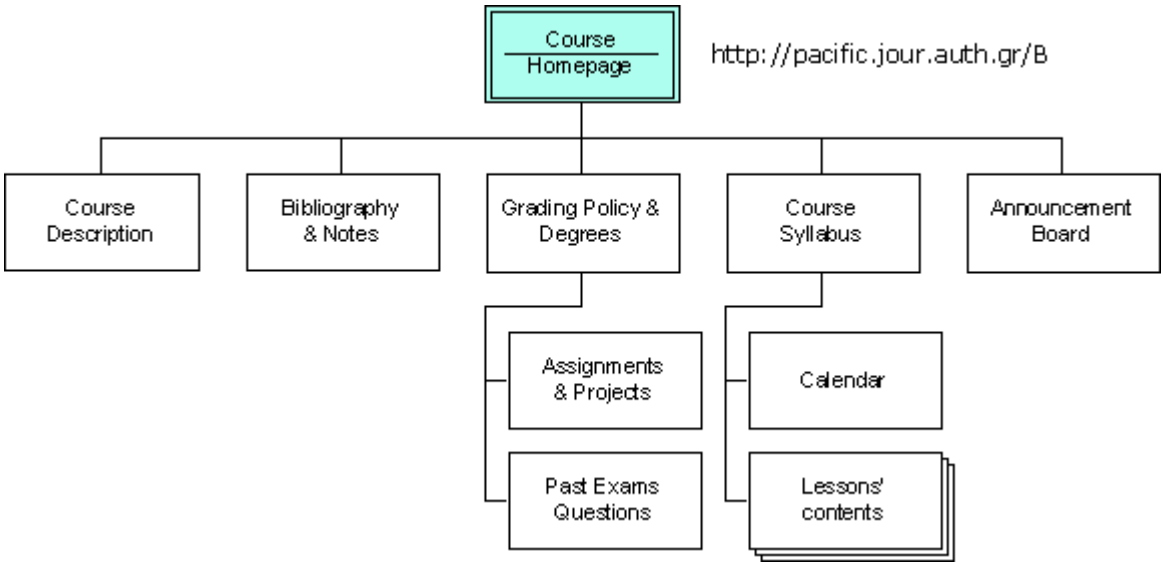

Fig. 1. Web site structure and main sections

Homepage: This is the first page that views someone entering the individual course web site. It contains a brief welcome message together with the names of all the course instructors and links to their own homepages. Furthermore, on the left side there are links to the main sections of the web site (Fig. 2).

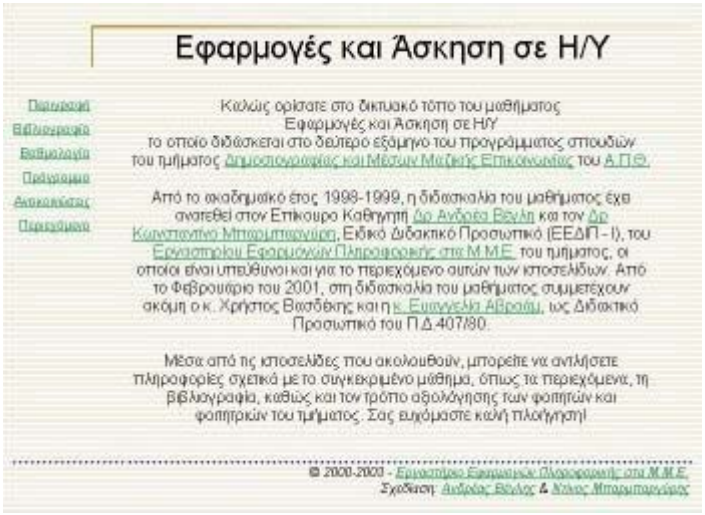

Fig. 2. Web site homepage

Course Description: This section provides an overview of the course objectives and a brief listing of the course contents (Fig. 3).

Fig. 3. Course Description section

Bibliography & Notes: This section provides a full listing of the proposed bibliography, comprising of Greek and mainly international book editions (Fig. 4). There are also links to the lecture notes that are coded in Portable Document Format (PDF) files (Fig. 5). Furthermore, this section facilitates the student's access to supplementary on-line material, through links to various international web sites.

Fig. 4. Bibliography and Notes section

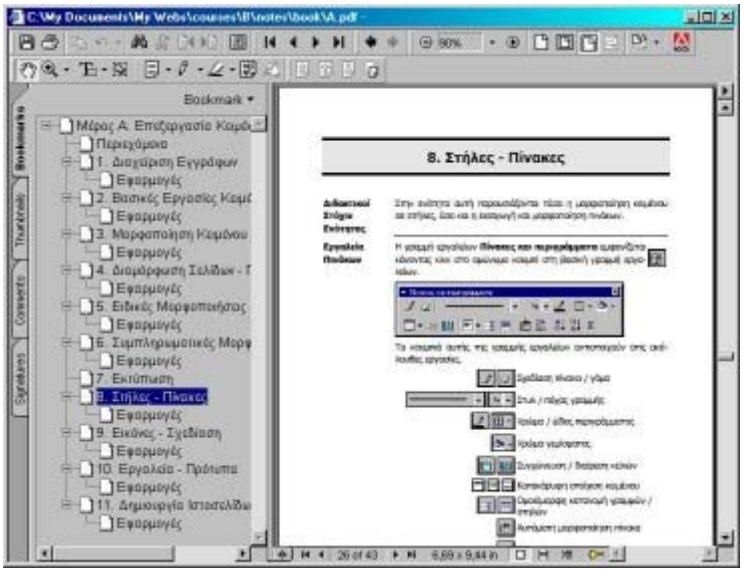

Fig. 5. Popup window with notes in PDF

Grading Policy & Degrees: This section states in a straightforward manner the course grading rules (Fig. 6). On the right there are links to the subject matters of the current-semester assignments and projects (Fig. 7), as well as, questions from past exams (Fig. 8). Finally, there is also a link to the course grade book (Fig. 9) where each student can view its own degrees, so long as a special form is correctly filled-in with the student's unique password.

Fig. 6. Grading Policy and Degrees section

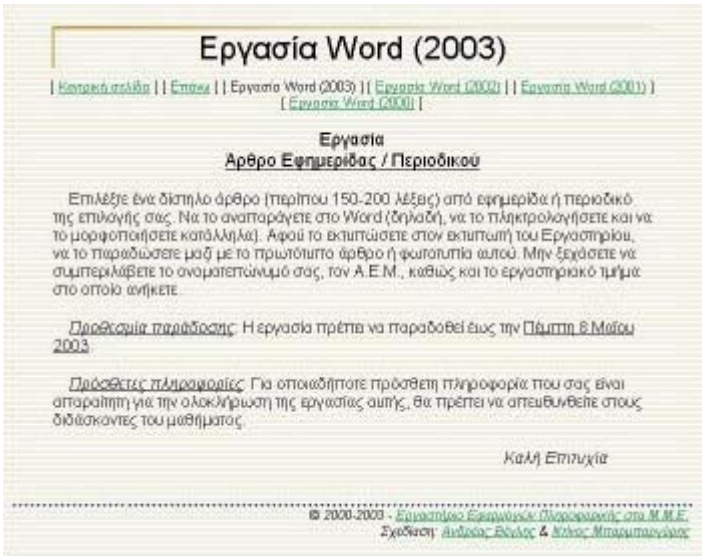

Fig. 7. Project matter

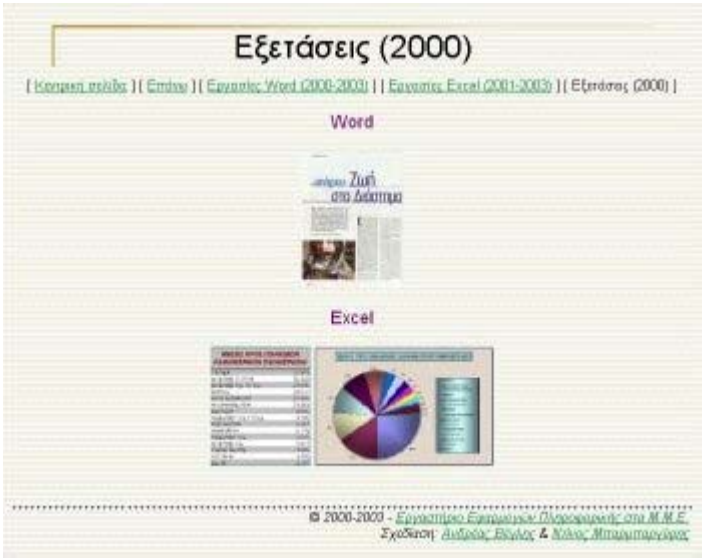

Fig. 8. Matter from Past Exams

Fig. 9. Grade Book

Course Syllabus: This section provides the course syllabus in a weekly basis, along with instructors' office hours (Fig. 10). Also, there is a link to a monthly calendar (Fig. 11), where, after selecting the lesson's date, the student can view the specific lesson's contents and access supplementary course material in PDF files (Fig. 12). Exactly the same destination can be reached through a drop-down menu of the timetable section, where the student can directly select the lesson's number.

Fig. 10. Course Syllabus section

Fig. 11. Calendar

Fig. 12. Lesson's contents

Announcement Board: This section provides a list of all the course announcements; in reverse chronological order, i.e. the most recent one resides on the top of the page (Fig. 13).

Fig. 13. Announcement Board

Student survey

Following the development and use of the course support environment, a formative evaluation was conducted. Students, that had just completed the second semester, were asked to supply feedback about the effectiveness of the course-support environment, by expressing anonymously their opinion about the following statements presented in Table I.

(1)	In general, the course-support web site is useful.
(2)	The material of the Course Description section is useful.
(3)	The material of the Bibliography & Notes section is useful.
(4)	The material of the Grading Policy & Degrees section is useful.
(5)	The material of the Course Syllabus section is useful.
(6)	The material of the Announcement Board section is useful.
(7)	The material of the Past Exams Questions is useful.

Table I. Statements about the web site.

They were provided with five categories as possible answers (Table II).

Answer	Score
(a) Strongly agree	2
(b) Agree	1
(c) Neutral	0
(d) Disagree	–1
(e) Strongly disagree	–2

Table II. Possible answers.

A total of 84 questionnaires were returned and the average scores of the students' answers are shown in Table III.

Question	Average score
1. Web site in general	1.10
2. Course Description	0.70
3. Bibliography & Notes	0.54
4. Grading Policy & Degrees	1.00
5. Course Syllabus	1.10
6. Announcement Board	1.27
7. Past exams questions	1.25

Table III. Average score of students' responses.

It can be readily seen that the students had a positive opinion for the usefulness of the Web site in general (score 1.10). Between the various sections of the Web site they ranked higher from all the Announcement Board (score 1.27), and followed the Course Syllabus section (score 1.10), the Grading Policy & Degrees section (score 1.00), the Course Description section (score 0.70) and the Bibliography & Notes section (score 0.54). It is interesting to note that they also found useful enough the Past Exams Questions subsection (score 1.25). It is obvious that all students exhibit a positive attitude towards all the sections included in the course support environment. The variation on the degree of satisfaction indicates that the sections that include static information (Course Description and Bibliography & Notes) appear to be less attractive to the students with the exception of the Past exams Questions section.

The students were also asked to respond on how often they had visited the Web site during the past semester and they were provided with five categories as possible answers: (a) Very often (score = 4), (b) Often (score = 3), (c) Sometimes (score = 2), (d) Seldom (score = 1), and (e) Never (score = 0). The average score between the 84 responses was 2.13. The above results indicate an adequate degree of acceptance of the course support environment even though the use of the site was not at all mandatory during the semester, since all the services comprising the Web site, continued to be offered in the traditional way, i.e. the announcements were also present at the board on the wall outside the laboratory.

Finally, the students were asked to comment –in free form– on the Web site or to suggest possible ways for improvement. Although few of them replied to this part of the questionnaire, their comments were indeed a pleasant surprise for the instructors. The students asked for a higher integration of the support environment into the conventional course, more active encouragement to use the Web site, and the development of similar environments for all the courses they attend.

Conclusion

The web-based environment that was designed and implemented for the support of the office automation courses at the J&MC Department of AUTh has been proved an invaluable tool both for the students and the course instructors. The results from the overall process were very encouraging. The students seem to be able to cope well with the integration of the Web as a tool to enhance traditional classroom lectures, and also encourage the adoption of similar course support environment in all the courses they attend.Its gradual integration into the teaching and learning procedure makes its adoption from both sides – instructors and students– a natural consequence of the information age we all experience, and has already attracted some useful suggestions for its future improvements.

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Stress caused by on-line collaboration in e-learning

The Open University (OU) has some 220,000 students on-line using e-mail and web sites. The Open University Business School (OUBS) uses collaborative on-line work extensively in their courses

Regular surveys of thousands of OU students by the Institute of Educational Technology show that on-line activity is one of the least popular elements of OU courses. The reasons for this are complex and often to do with access issues.

In order to ascertain whether stress might be an issue for students, during the winter of 2002/2003 two scoping studies were carried out. Students from two groups taking part in the one-year Diploma in Management course completed questionnaires to establish what students felt about their regular, course-based, online group activities. Students from the Online Management Challenge, where students undertook group–based activities over a period of 18 days, were also asked about their experiences whilst working online.

One of the two Diploma groups consisted of students from a wide variety of backgrounds including both public and private sectors. The second group comprised students who were all employed by the same corporate. They used e-mail extensively and already knew each other in the work environment. The results of the questionnaire showed that students from both groups described their on-line collaboration work as 'stressful', however this was 40% of the students from the first group, with little prior experience of online working, and 53% of the more experienced students from the second group. The reason for this appeared to be that since the second group knew each other well, and were work colleagues, the fact that they could let colleagues down by not contributing sufficiently to the collaborative work caused more stress than the first group who did not know each other prior to collaboration.

In contrast to this, a group of students carrying out a continuous on-line activity over 18 days were asked about their experiences of stress. The event had significant introductory activities designed to ease students into the collaborative process. The majority were already very experienced in working online, as they were currently completing a one year course tutored on-line. Of these most did not find the activity stressful, those that did experience stress attributed this to:

- Wanting to do a good job and keep up with the *perceived* expectations of the other group members
- The fact that the activity coincided with time when they should be revising for an exam
- The need to wait for replies to postings before they could continue with their own work
- The amount of time it took (they were expected to spend about 1 hour a day, but many students chose to spend longer)

The timing of the event and the fact that the students were working with unknown students for a short period can explain the first two causes. The third was not a common problem, but the fourth reflects the fact that students are spending longer than expected carrying out the tasks, which in turn causes stress. The introductory activities appeared to have helped as an introduction to collaboration.

The results of these studies indicate that there is potential for stress to be caused through collaborating in on-line groups whether in e-learning or in a work environment. Little research appears to exist in this area, but as e-teams look set to be a significant factor in future working and learning, and even researching, methods of limiting this type of stress need to be investigated. At present we are working on a detailed questionnaire for a further batch of around 200 students taking the 18 day Online Management Challenge, and experimental introductory activities to reduce stress for the one-year Diploma in Management.

We would welcome contact and collaboration with anyone researching the area of on-line stress.

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What Is Reality: Education Behind Closed Doors or with Open Online Access?

Ren has been teaching secondary school English for fifteen years in a traditional classroom. He has also instructed an online British Literature course for two years and an online American Literature for one year. The exploration has been exhilarating. The battles with tradition –relentless.Ren is currently developing an online module to teach research writing for 11th and 12th grade students.

The first schools in history had no paper, no pencils, no chalkboard, and no teacher's desk. Instead, the sons of aristocrats walked and talked, questioned and wondered in the streets of Athens until they were enlightened. Was that a real education? I think so. Should, then, the twenty-first century reel in horror at the specter of an education that leaves these same accoutrements behind? –Of course not.

For more than a thousand years perfect penmanship, exquisitely accurate quillwork, was the requirement for civil service. Those with the gift of fine motor skills could write their ticket out the drudgery of the short, brutish existence of the illiterate peasantry. Now, dare I say it, though the pen is mightier than the sword, its frivolous, aristocratic plume has been plucked by the microchip. Be as traditional as you like, but, let us, through tradition be put in mind that education is a creature of ideas; its throne rests on a point beyond space. Real education is not the shrieking of chalk on a chalkboard behind the closed doors of a one-room schoolhouse. These are but it's trappings.

Having, then, exorcized the demons of education's disembodied raiment flailing eerily at us as it glides away in the breeze of history, let us look, now, at its body. Though this may terrify, remember we're doctors. I suggest we hurry lest the patient die and we become morticians too.

When we talk of a real education, I believe "real" is really the issue. Though we may differ somewhat on new math or old, health education and abstinence, and the value of Columbus and Karl Marx, in general, we would probably all agree that the closer we get to what contemporaries of Columbus actually thought of him or to real world mathematical data, the better. Indeed, Peter Milbury, who has an older but interesting site on primary sources says, "If you look carefully around the Web, you will find that there is something for just about any interest or curriculum area" (1999).

Did you notice how close at hand Peter's actual work was? I saw a car commercial recently that demonstrated how the Internet has changed car purchases. Entire car show rooms gyrated to reveal the finest choices of color, price, interior, make and so on. Tremendous pounding noises accompanied these show room transformations to show the power of the Internet.

Now, similarly, if you would imagine an imaginative instructor, looking a little like Ichabod Crane, staring over his horn-rimmed spectacles and saying, "Class turn to the civil war." Instead of fussy students lethargically turning the pages of a history book published in 1810, the room is turned into a maelstrom of documents whizzing in a fashion fit to wake the dead and most of the students. Then Ichabod cries with the voice of a sorcerer, "the letters of Lincoln!" Instantly, each desk is littered with piles of yellow documents falling from the dissipating hurricane of facts. Finally, Ichabod smiles and says, "the letters of Abe Lincoln to Ulysses S. Grant," and a small package of parchments, neatly stacked by date, sits on the gleaming desks of the aghast pupils. "Ok," continues Ichabod, "let's break into groups. In an hour I want five reports from groups of four about the relationship between the general and his president."

Textbooks were once the most economic way of getting information to a group of students. Even today, no traditional library can allow thirty students to view the same original three dimensional information sources at the same time. I would like to say that the Internet has come. Neither three dimensional libraries nor textbooks can now compete with the invisible flow of binary particles flooding our desktops with information. Real education exists online because it is there that the most real information, the most real experts, and the most real freedom to explore the ideas we teach abounds.

However, there is one more bare, naked element of real education that lives in cyberspace: real application. It is in real application that real educational communities, schools of learners swim. Here is a link to a series of Civil War National Parks that have a number of ongoing projects that students can participate in. As is the case with this link, many of the information sources also have experts available for student inquiry. No matter what the subject area an online teacher wants to communicate to an online student, there is a real world community online already surrounding that knowledge.

Whether we say teacher, student, facilitator, learner, moderator or peer, in education we are referring to the sources of our ideas and the expression of the meaning these ideas have to us as a community. The terminology of education orbits the realities of education: ideas and the associations their sources engender. Whether it is the peripatetic methods of Socrates, the quill and primer of colonial America, or the digital realities of the twenty-first century, a real education, like breathing requires the freedom to give and to receive, to absorb and to transmit the ideas and values and practices that make us better, that allow us to be the best we can be. Where these freedoms are most abundant, there also is the reality that is education. Whether we are traditional or digital, as educators, let us focus on the body of our practice not its momentary fashions.

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E-LEN project: Working towards an e-learning design pattern language

The need for educational design

The discipline of educational design is struggling to find methods of dealing with complexity. More comprehensive and subtle conceptions of learning, and the diversifying affordances of new technology, create design problems which cannot be

solved by the methods of instructional design that prevailed through the 1960s-80s. Compounding the problem, the so-called 'constructivist revolution' among North American instructional designers during the late 80s/early 90s took attention away from the fact that more complex conceptions of learning need *richer* methods of educational design, not the abandonment of design altogether (see e.g. Duffy & Jonassen, 1992).

In the last few years we have seen a renewal of interest in systematic approaches to educational design, and some of this work gives proper regard to the complexity of learning. Van Merrienboer's 4C-ID methodology, which is aimed at designing tasks for the acquisition of complex skills, would be one good example (see e.g. van Merrienboer, 1997). However, task design is not enough. The physically and socially situated character of learning means that educational design also needs to work on the physical setting within which learning 'takes place' and on those aspects of social organisation which can have beneficial effects on learning, notably through creating the conditions in which a learning community can thrive. Educational design therefore has (at least) three main components: task design, the design of convivial learning spaces and the design of organisational forms which are conducive to learning as a social process.

Thus we should not try to design the elements which are most closely involved in learning itself. We should try to design organisational forms, learning spaces (the physical learning environment, including all the artefacts which embody 'content') and learning tasks. But we should expect students to customise our learning spaces and make their own 'local habitations' or 'nests' (Nardi & O'Day, 1999; Crook & Light, 1999; Crook 2002).

Design patterns for e-learning have the potential to help us not only with the design of learning tasks, but also with the design of space and the design of convivial organisationalforms.E-LEN, A Network of E-learning Centers, is a European network of institutions with e-learning expertise, that aims to share and develop information and design patterns regarding e-learning. A key activity for E-LEN is the dissemination of design patterns to interested parties.

E-LEN is a part-funded partnership project by the European Union through the Minerva programme, [http://www.tisip.no/E-LEN/]. It works closely with the e-learning community to construct a knowledge base for educational design. Central to our work are ideas about re-usable design knowledge, methods of sharing design experience and the need to support the work of multidisciplinary e-learning design teams such as the staff of e-learning centers. As we work, we are inviting people to participate in critiquing and refining the design patterns. The more views we can incorporate from members of the e-learning community, the richer this resource will be.

The E-LEN partners are:

- University of Cyprus, Department of Computer Science (CY)
- Lancaster University, CSALT – The Centre for Studies in Advanced Learning Technology (UK)
- A Priori Limited (UK)
- Universiteit Maastricht - The Learning Lab – Universiteit Maastricht (NL)l
- Open Universiteit Nederland (NL)
- Norgesnetter med IT for Open Læring – NITOL (NO)
- The University of Bergen, InterMedia (NO)
- National Technological University of Athens, Institute of Communication and Computer Systems (GR)
- PolotecnicodiMilano - Hypermedia Open Center at the Department of Electronics and Information (IT)
- Technische Universität Ilmenau - Institut für Medien und Kommunikationswisseschaft (IfMK) (DE)
- UniversitýdellaSvizzeraItaliana - Faculty of Communication Sciences (CH)

Why E-learning Design Patterns?

Design patterns originate in the work of the architect Christopher Alexander. According to Alexander, a pattern 'describes a problem which occurs over and over again in our environment, and then describes the core of the solution to that problem, in such a way that you can use this solution a million times over, without ever doing it the same way twice' (Alexander et al., 1977).

Design patterns have been adopted in software engineering and are now flowing into other areas, such as educational design. Alexander was concerned with patterns in the built environment. It's easy to see how his ideas can help with the design of virtual environments. In fact they go beyond this and allow us to capture the essence of a wide variety of areas of pedagogical and design experience. Design patterns provide a structure for integrating the analysis and solution of a problem, in a way that is sensitive to context and informed by theory and evidence. A pattern suggests rather than prescribes a solution. Solutions are intentionally incomplete: they offer guidance but require embellishment.

Design patterns make best sense when they are seen in relationship to one another. A pattern language is a structure for design patterns. It allows a design team to move from large scale to more detailed patterns, managing the complexity of the design task and refining and embellishing design solutions as the nature of problems and context becomes more certain. In the E-LEN network, we emphasise the use of a pattern language as a descriptive device, a lingua franca for creating common ground among members of a design team. A pattern language enables people to find better ways to talk about their educational beliefs – sharing and examining their intuitions about good learning and teaching. Moreover, patterns should be

abstractions based on empirical observation of recurring phenomena in learning environments. The empirical aspect of design pattern construction is of great importance – especially with regard to convincing practitioners of their validity.

Conclusion

Creating a pattern language of e-learning is a huge endeavour. The pattern language published in Alexander et al (1977) was the result of eight years work by a substantial team. This work involved both an attempt to understand the nature of the building process (very broadly defined) and to construct an actual possible pattern language. We do not believe that the E-LEN project will construct a pattern language for e-learning, but we will provide the foundation for this task. We advocate that patterns and a pattern language ought to be produced and made accessible in a way that allows learners to use the ideas in configuring their own learning environments.

The E-LEN consortium maintains an E-learning Design Patterns Repository containing a collection of design pattern for e-learning. These patterns have been jointly developed by e-learning experts from both the E-LEN consortium and from other institutes. This repository is an active entity that is constantly being enlarged with the addition of new design patterns.

The design patterns are classified in four categories; these have been produced within special interest groups (SIGs) made up of members of the E-LEN network and people with specific expertise. The SIG categories are:

- learning resources and learning management systems
- lifelong learning
- collaborative learning
- adaptive learning.

Design patterns are always open to improvement. We can annotate patterns to give some indication of our sense of their status. Some patterns feel as if the solution captures something essential and complete. Other patterns have much more tentative solutions. Since the evolution of a structured collection of patterns and the establishment of a pattern language is a collective endeavour, we invite all e-learning experts and practitioners to participate in the e-learning pattern language construction process and welcome suggestions and criticisms.

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