

# Weblogs - can they accelerate expertise?

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## Introduction

Weblogs, originally a simple web browser based system for updating websites, have developed into powerful web based content management systems, capable of acting as a platform for learning that can accelerate the development of expertise learner behaviour.

The paper begins by examining the basics of 'weblogging' from its cultural roots through to an overview of current weblog functionality. Assessment is made of the way weblogs are able to support areas of education such as research and collaboration, and the findings contribute to assessment of a weblog's utility as a general learning resource.

The essay then moves to examine and test it's central thesis; that weblogs can accelerate learning and in particular, support the areas of educational theory such as metacognition, that lead to expertise.

After thorough examination of cognitive theories on expertise and an assessment of how weblogs can accelerate the development of such skills, the essay moves to outline hypothetical learning outcomes for a weblog based, collaborative student project. Comparison is made, using Bloom et al's (Bloom et al, 1956) taxonomy of learning objectives, between potential student achievement and the emergent behaviour of the weblog software.

## Weblogs - a definition

The name 'weblog' derives from the medium in which they emerged - the conjunction of the words web and log. Weblogs are in their most simple form, online journals; websites displaying a chronological structure of 'posts', which adhere to a diary like structure. In the late 1990's weblogs appeared in increasing number, due to the fact that several companies and individuals had released easy to use, web-based software tools to create weblogs (Blood R, 2000). In subsequent years, weblogs have arguably reached a 'tipping point'

where estimates (as of February 2002) put the number of active weblogs at 500,000 (Manjo F, 2002). Weblogs have moved from being simplistic online journals to become complex content management systems, offering meta-linking, collaborative tools and other educational features.

To gain an understanding of how weblogs can act as a learning resource, it is useful to look at some of the technical and social features that represent commonality between the different implementations of weblog software. Once this understanding has been developed, I will move onto examine these features in more depth, retaining a clear focus on the educational value they offer.

## What makes a weblog?

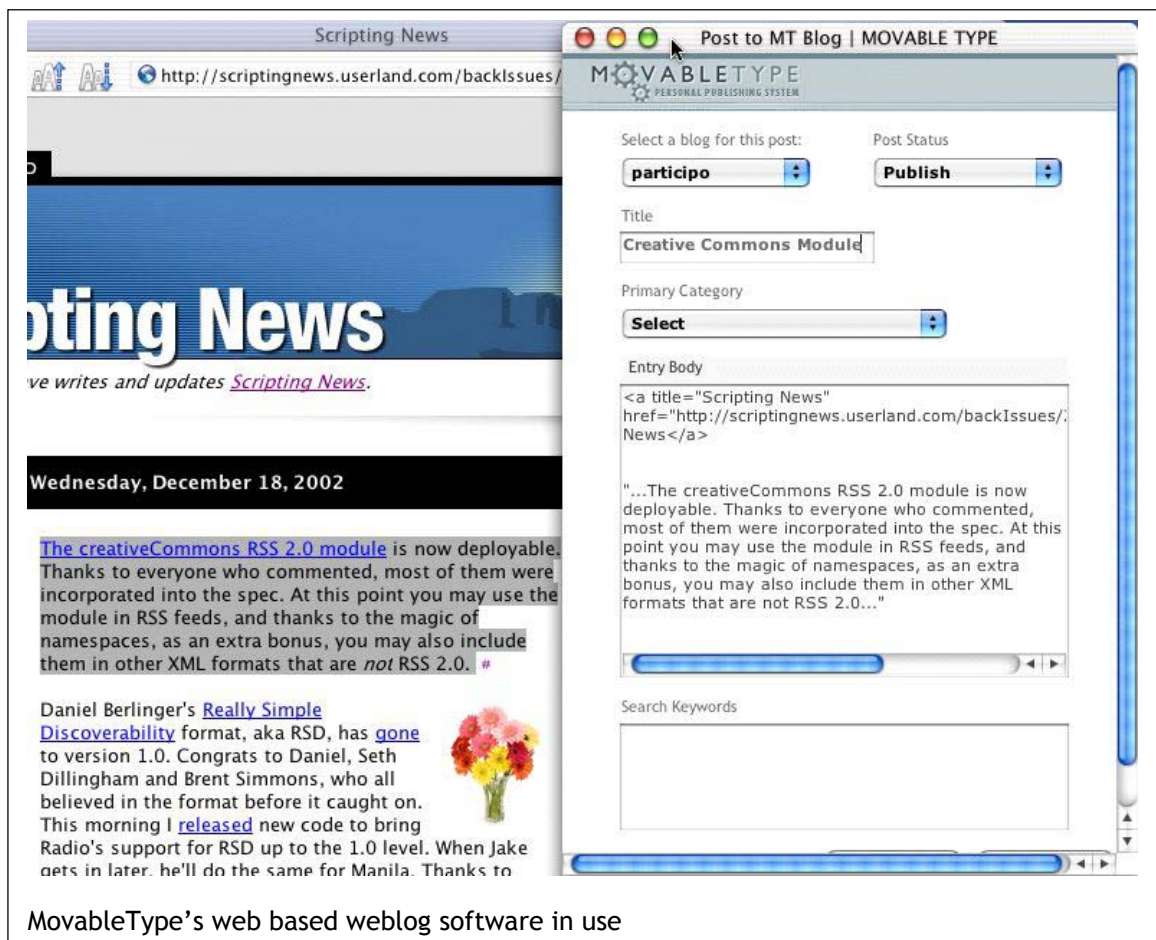
Perhaps the most obvious feature of a weblog is the style of the writing and it's hyperlinked, pithy structure:



"When we talk about weblogs, we're talking about a way of organising information, independent of its topic. What we write about does not define us as bloggers; it's how we write about it (frequently, ad nauseam, peppered with links)..."  
(Hourihan, M 2002)

This style of writing is a crucial element of weblogs, and one that has benefits and drawbacks for the weblog as a learning tool. On the one hand, the short entries, commentaries and intra-linking help develop a sense of identity and allow for quick retrieval of information. Conversely, this style of writing rarely enables deep, reflective thought and commentary. This is not a limitation of the weblog software however, but a cultural norm of weblogs, a norm that is changing as weblogs start to be used professionally by journalists, educators and writers.

A significant factor contributing to the use of weblogs is their ease of use. Typical weblog software is presented through a web-browser, which exhibits a simple interface for the inclusion of text and urls. Users are able to quickly capture notes from Internet websites by highlighting relevant text and clicking a link in a web browser:



MovableType's web based weblog software in use

Features such as automatic text highlighting and straightforward 'one-click' posting to a user's own weblog add to the weblog software's increased utility. The final trait shared by all weblog software is the 'date-stamping' and automatic archival of posts. This archiving allows for searching and permanent links to entries - a factor that increases a weblog's utility as a tool for personal knowledge management (Doctorow, C 2002).

## **Examination of weblogs from an educational perspective**

In order to assess whether weblogs are able to function as a learning resource (and indeed accelerate learning and therefore expertise), an understanding of the various technical and social features of weblog software must be made from an educational perspective.

Weblog software is examined from a number of educational criteria; each of the criteria is listed, with an explanation, an example of weblog software in use and an assessment of the software's educational utility in that area.

It is hoped that this analysis will facilitate the further assessment of how weblog software can contribute to and potentially accelerate learning and expertise.

### **Research**

Research is a critical part of a student's educational journey (Gagne R M, 1988) and the ability to take notes, record material and create a library of resources is a fundamental part of the research process. Learning takes place however, when the student begins to analyse material, comparing, discriminating and formulating opinions and theories about the material they have researched (Hollingworth R, and McLoughlin C, 2001).

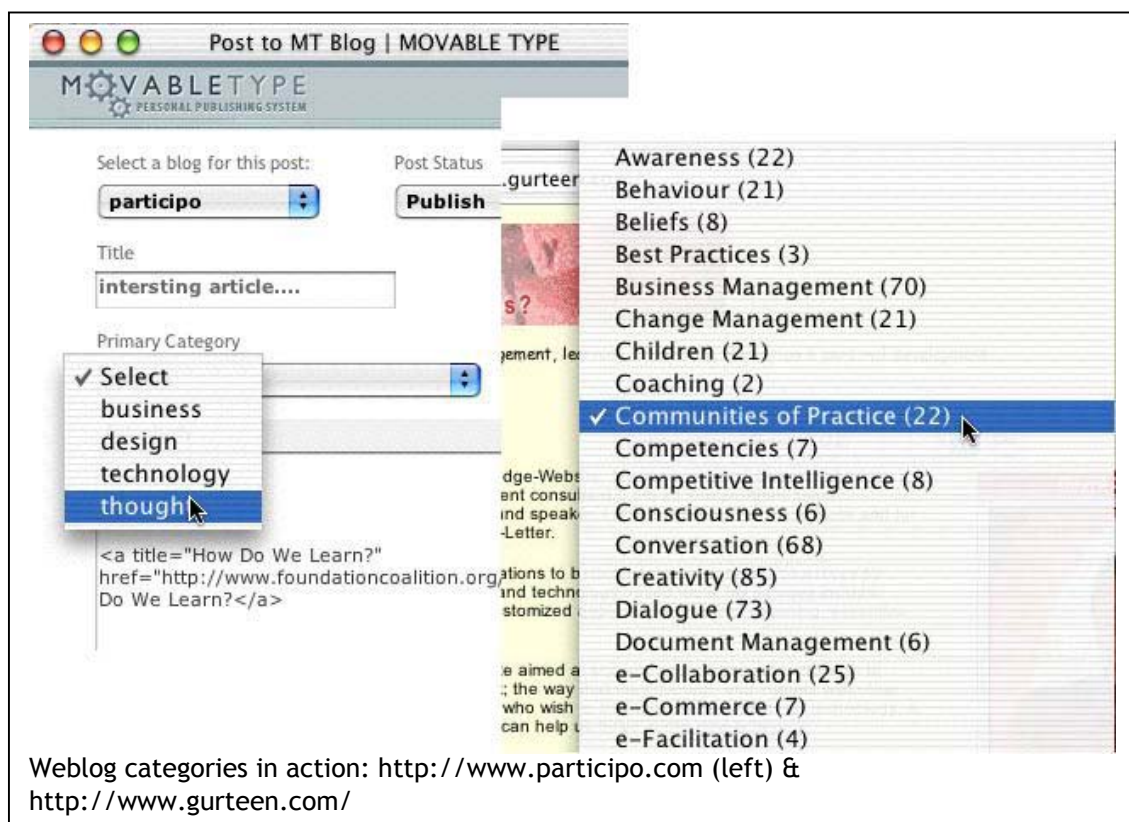
With their emphasis on recording and annotating urls, weblogs, it has been argued, can act as a significant enhancement to the learner's research process:

"...they (weblogs) work wonderfully as personal post-it note systems, since most weblog tools have bookmarklets that let you grab a url and annotate it as you go. They are useful if you work in a distributed environment (in whatever form) and it is useful for students to be able to write about their work and to have that writing accessible in different places in different contexts." (Miles A, 2002)

The very nature of weblogs then, lends itself to the demands of self-directed research and the utilisation of the resultant knowledge in a flexible and simple way.

### Taxonomies

Another facet in the development of learning and expertise is the ability to 'organise knowledge in ways that facilitate retrieval and application' (Bransford J, Brown A, Cocking R, et al, 2000). Creating taxonomies of research material for retrieval and application can be performed in a simplistic way using the categorisation features of weblog software:

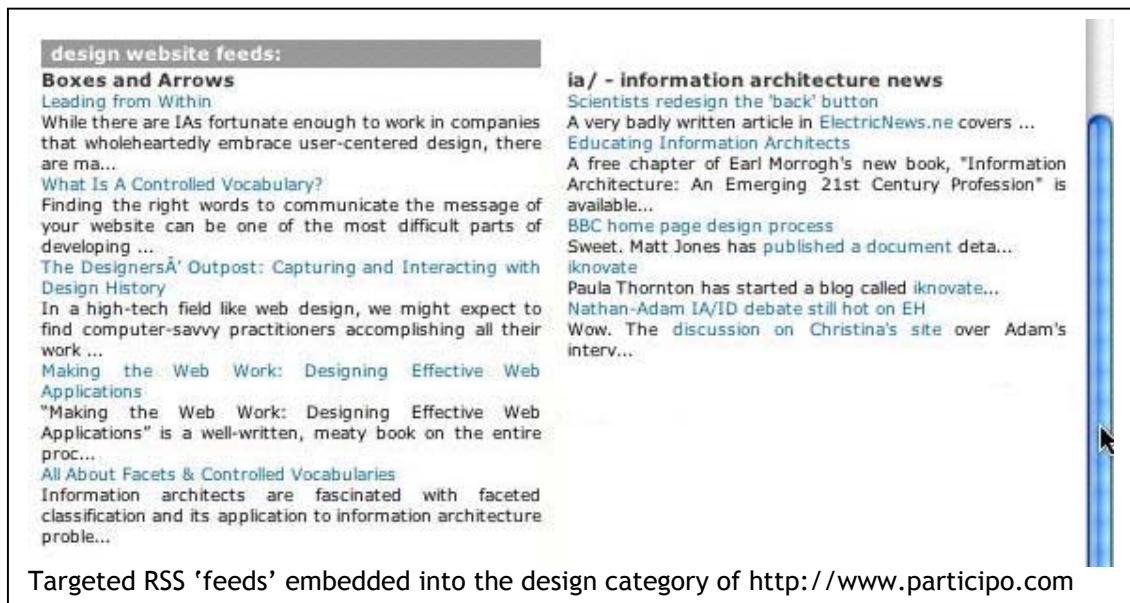


The categorisation feature of weblogs enables the rapid creation of useful and relevant taxonomies, thus enabling the student to not only demonstrate the basic foundations of learning but also to begin categorising their research efficiently and quickly, developing the weblog into a useful body of retrievable work. By assessing the categories chosen (and indeed how these categories develop) teachers have the opportunity to begin to assess, in a rudimentary way, demonstration of 'application' by the student as defined by Bloom et al's taxonomy of educational objectives (Bloom B et al, 1956).



## Developing domain knowledge

As the learner develops further expertise, aggregating knowledge relevant to their chosen discipline will enhance their educational development. A technology utilised by weblog software, Rich Site Summary (RSS), enables weblogs to display up-to-date, embedded content from other weblogs and web sites:



The screenshot shows a web page with two columns of RSS feeds. The left column is titled "design website feeds:" and contains several entries with titles and short descriptions. The right column is titled "ia/ - information architecture news" and also contains several entries. A vertical scrollbar is visible on the right side of the page.

**design website feeds:**

**Boxes and Arrows**  
Leading from Within  
While there are IAs fortunate enough to work in companies that wholeheartedly embrace user-centered design, there are ma...

**What Is A Controlled Vocabulary?**  
Finding the right words to communicate the message of your website can be one of the most difficult parts of developing ...

**The Designers' Outpost: Capturing and Interacting with Design History**  
In a high-tech field like web design, we might expect to find computer-savvy practitioners accomplishing all their work ...

**Making the Web Work: Designing Effective Web Applications**  
"Making the Web Work: Designing Effective Web Applications" is a well-written, meaty book on the entire proc...

**All About Facets & Controlled Vocabularies**  
Information architects are fascinated with faceted classification and its application to information architecture proble...

**ia/ - information architecture news**

**Scientists redesign the 'back' button**  
A very badly written article in [ElectricNews.ne](#) covers ...

**Educating Information Architects**  
A free chapter of Earl Morrogh's new book, "Information Architecture: An Emerging 21st Century Profession" is available...

**BBC home page design process**  
Sweet. Matt Jones has published a document deta...

**iknovate**  
Paula Thornton has started a blog called [iknovate](#)...

**Nathan-Adam IA/ID debate still hot on EH**  
Wow. The [discussion on Christina's site](#) over Adam's interv...

Targeted RSS 'feeds' embedded into the design category of <http://www.participo.com>

This subject relevant information, if carefully selected, can create a useful flow of information relevant to the learner. Using this type of ancillary information will, however, require the teacher (and learner) to be aware of the dangers that broad but superficial knowledge presents and that personal research is not substituted by this automated tool.



### Recognising relationships within disparate data

One of the definitions of expertise is that of demonstrable understanding of relationships and meaning between seemingly disparate facts (Bransford J, Brown A, Cocking R, et al, 2000). Weblogs can utilise their database-stored entries and create meaningful relationships between seemingly unrelated entries and websites:



Whilst this 'self-discovery' of related posts and other websites is impressive and can, arguably, assist the novice learner by presenting expert-like information relationships, there are several caveats that should be noted. Firstly, there is a significant danger that learners will come to rely upon this system, that they will become, in effect, 'lazy' experts and never have or need the opportunity to develop the skills of detection themselves.

This problem is countered somewhat by the necessity of the learner to specify metadata about the posts as 'search keywords' when entering a post to the weblog. The need to produce effective metadata does present an opportunity to practice reflection and analysis and arguably, learners will still need to view the posts presented and decide if they are relevant and indeed, hold a useful relationship to the original weblog contribution.

## Collaborative learning

Encouraging self and peer assessment is a critical part of any learning environment (Gagne R, 1988, Hollingworth R, McLoughlin C, 2001, Yang H, 2001). While this requires the teacher to develop a culture of non-punitive assessment from peers and the individual learner, the logistics of this additional learning process are significantly simplified when work is presented through a weblog. The 'add a comment' feature of weblog entries enables the author and peers within a learning community to develop annotated, indexed material with the inclusion of commentary and reflection:

The most recent list, for the [Class of 2005](#), reminds us that these people were born the same year as the PC & the Mac (1983), newspapers have been printed in color for their entire lives, and Oprah has always been a national institution. These might not affect their understanding of curriculum, but we have to keep in mind that they have no real reference to the origins of "cc" in e-mails.

*(The most recent list seems to have been announced in August 2000 for the class of 2005, so it's not certain that they will be continuing this series.)*

xxx | 03:31 pm 4 comments so far | [add a comment](#)

ha! that makes me feel old as hell. Is interesting point though - I often (always?) feel like I'm designing for an invisible audience - and I think there is a tendency for (particularly e-learning) content to be dumbed down to the lowest possible denominator - so everything is carefully explained, laid-out and categorised. Do we make too few assumptions? Maybe we should just raise the bar and assume people know how to print etc etc.

posted by xxx | July 18, 2002 04:29 PM

Maybe its because we didn't grow up with computers and printers that we feel its necessary to explain these things. For someone who has known computers for their entire lives, telling them to "Use you mouse to click this button" probably makes them feel condescended-to.

posted by xxx | July 18, 2002 05:03 PM

Of course, but what I was really asking is "should we dumb down at all?". Why not assume a higher level of intelligence/competency and then simply expect those who don't know to find out. The best solution is to fully understand your audience - but that proves difficult in a number of cases, or you simply do have a vastly mixed audience. Why not puch the weakest of learners a bit by pushing the bar upwards?? Use words with more than 3 syllables - they don't know what it means? Look it up. I learn like this from reading books - I'm always lookign up words.

posted by xxx | July 18, 2002 05:22 PM

I believe both angles are correct. Dumbing down to short words and simplistic explanations is always condescending. As guy said, learning happens when the student is challenged. Challenged to broaden both language and understanding. While is could be interpreted as condescending to spoon-feed the user/student, it is probably wise to channel them. The problem then, becomes one of language. I.e. "Use the mouse to click this button and proceed." is an order which is interpreted as prescriptive? "Click here to proceed" is an order, but is interpreted as instructional

posted by xxx | July 22, 2002 06:27 PM

Reflection and commentary, <http://www.participo.com>

These comments offer the opportunity for reflective thought and the update of original entries from the learner themselves, as well as their peers and teacher. The commentary and assessment is kept as part of the original weblog entry, maintaining context.

## Examining expertise (can weblogs can accelerate expertise?)

The objective of this section is to examine in detail the aspects of the educational process that contribute and lead to expertise. In doing so, elements of weblog functionality will be re-introduced and examined to discover if they can contribute and accelerate the development of expertise

In defining expertise, I am attempting to quantify the way in which learners develop towards expertise and how this becomes part of an overall learning experience:

“The study of expertise shows what the results of successful learning look like.”  
(LeFrancois G, 1997)

## Defining Expertise

In order to properly assess the development of expertise, one must first define what expertise actually is. By developing a meaningful understanding and definition of expertise, examination of the way in which these skills develop becomes more useful.

One of the main demonstrable traits of expertise is the ability to conceptualise and structure knowledge in meaningful and usable ways (Bransford J, Brown A, Cocking R, et al, 2000). Experts develop sophisticated conceptual models based on their current understandings and manage new and existing information in a structured way.

Understanding the different ways in which experts and novices approach abstract problems helps define the cognitive process of experts:

“...experts and novices begin their problem representations with specifiably different problem categories, and completion of the representations depends on the knowledge associated with the categories. For the experts initially abstract physics principles to approach and solve a problem representation, whereas novices base their representation and approaches on the problem’s literal features.”  
(Chi, M, Feltovich P, Glaser R, 1981)

So, when presented with cognitive problems, experts are able to disassociate their initial thoughts from the ‘obvious’ elements of a question and utilise more abstract ways to arrive

at solutions. This abstraction; the ability for experts to cognitively step away from problems and then utilise refined conceptual models is one of the traits of expertise.

Bransford et al argue that the additional ability of experts to recall 'usable' information lies in the fact that experts have conditionalised their knowledge in ways that represent some form of context. This conditional knowledge is only used when the expert sees it as having relevance (Bransford J, Brown A, Cocking R, et al, 2000).

If this knowledge is conditional, then by definition, this knowledge is in fact, changeable; new information can affect the context and relationships of existing information. Experts should be able to quickly adapt and add new context and develop new conceptual models and relationships, upon the introduction of new knowledge and the development of new skills.

We may also categorise the utility of information itself as playing a role in the demonstration of expertise. Information, in and of itself, has no utility to an expert or a novice. It is only when information has, or is given, context, or is deemed relevant, or perhaps associated in some way with other pieces of information, that it becomes 'useful'. This is an important classification, because we can develop this idea further by stating that if pieces of information can in some way be assigned and retain this meta information (context, relationships with other data), they gain utility - even if they are used by someone else, or somewhere else, perhaps by a non-expert.

In summary, the definitions of expertise can be categorised into three main points:

- 1) Experts approach problems in abstract ways, which are not obvious or perhaps even comprehensible to a novice. Experts are able to do this because their grasp of conceptual models enable them to 'see' relationships and patterns between seemingly unrelated ideas, data and facts.

2) Experts are able to conditionalise their knowledge to develop some form of context. Experts only utilise knowledge when the context is correct. This conditional knowledge, by definition, is subject to change. Experts are able to rapidly assimilate new knowledge, assign it relevant context and alter their existing conceptual models to take account of this new information.

3) Information in and of itself has no utility. It is only when information is assigned relevance, context or is associated with other information does it hold any value. If this information can maintain this meta-data of it's own utility, even when removed from the structure that assigned it the information, then the information retains value.

## **Learning expertise**

As the definitions of expertise have been examined, assessment of the ways in which learners develop that expertise is now possible. The dominant theme that emerged in the definition of expertise was self-motivated assessment and cognition. It follows then, that examination of the learning that leads toward expertise should focus on theories of self-directed learning. In examining these selected learning strategies, I will attempt to identify the areas in which weblogs can potentially assist and accelerate the learning and development process.

### **Self-directed learning**

One learning technique that contributes toward expertise is that of self-directed learning (Gagne R, 1988, LeFrancois G, 1997, Hollingworth R, McLoughlin C, 2001). Put simply, self-directed learning consists of educational strategies and techniques that allow a learner to create their own learning, conceptual models and relevancies.

Perhaps the core educational model that is related to self-directed learning is that of metacognition; the ability of learners to understand their own educational process and development. Metacognitive theory examines the ways in which learners acquire, organise, modify and recall information (LeFrancois G, 1997).

In terms of acquiring and organising information, learners utilise a process of semantic encoding:

"...information is registered very briefly in one or more sensory registers, then undergoes feature analysis or selective perception. The information next enters short-term memory...and is also subject to semantic encoding, in which form it enters the long-term memory."  
(Gagne R, 1988)

Learners who process information semantically for later retrieval are, in fact, assigning metadata to that information; what it is, why it is useful and what it relates to. This process is very similar, if not identical, to the process of blogging:

"Writing a blog entry about a useful and/or interesting subject forces me to extract the salient features of the link...This exercise fixes the subjects in my head the same way that taking notes at a lecture does, putting them in reliable and easily-accessible mental registers."  
(Doctorow C, 2002)

The opportunity for weblogs to accelerate and enhance the development of expertise at the semantic encoding stage of learning is clear. The act of blogging, in itself, provides an immediate and repeatable process for cognitive assessment and assignment of meaning to material. Secondly, weblogs assist the learner by storing information automatically in a database, enabling easy retrieval. One could argue that the learner still needs to recall the information to search for it, but the learner need only semantically encode a small piece of metadata, and use the weblog to retrieve the actual, larger piece of information. Finally, the information itself can be semantically encoded with metadata when entered into the weblog. This data can then be used automatically to become part of a wider collection of linked, structured information that can be accessed by not only the original weblogger, but also other novices, who immediately benefit from this automatic, collected expertise.

The weakness in this process is the description of the metadata into the weblog. At the moment, weblogs support only basic metadata for entries, consisting of keywords. While this is useful, it cannot match the richness of cognitive elements that a learner can attach and process to new information.

Another aspect of metacognition involves reflection. Reflection is at the core of effective learning:

“The reflective mode is that of comparison and contrast, of thought, of decision making. This is the mode that leads to new ideas, novel responses.”  
(Norman D, 1993)

There is a clear association with the way reflection leads toward expert behaviour. Expert’s reflection will result in the assimilation of information and the restructuring of relevant conceptual models and context attached to information. Learning strategies that aid reflection, therefore, aid the development of expertise.

In studying ways to facilitate reflection for learners, Hollingworth and McLoughlin outline three strategies:

First, in order to foster reflective thinking students need multiple sources of feedback on their understanding gained through social interactions. Second, reflective thinking will most likely occur in situations where problems are complex and meaningful to the student. Third, reflective thinking requires the student to organise, monitor and evaluate their thinking and learning to come to a deeper understanding of their own processes of learning”  
(Hollingworth R, McLoughlin C, 2001)

Is it possible for weblogs to facilitate these learning strategies? As we have seen in the section outlining collaborative learning, weblogs have a built-in mechanism for commenting on posts. If learners use weblogs to post examples of their work, then the ‘social interactions’ facilitating reflection can be made through the medium of the weblog. Because of the non-synchronous nature of weblogs, social interaction can happen in a dispersed, time independent way and commentary is recorded within the context of the original work, adding to the conceptual models of all involved. In this way, weblogs can be seen to support the process of reflection. Also, this newly developed information can be utilised as a resource. It should be noted that web based discussions do not offer the same level of nuance as personal, face-to-face conversations and therefore it would be advisable to use the weblog as a medium for continuing conversations and reflections between students ‘offline’.



The second strategy for reflective thinking is useful to note, but has more to offer in an examination of learning material design. The third strategy for reflection could be significantly enhanced by the use of weblogs. Both the categorisation, intra-post searching and comments features of weblogs offer scope for the learner to organise, monitor and evaluate. Perhaps the key element for reflection offered by weblogs is the act of writing itself. This process requires utilising the cognitive disciplines previously outlined and weblogs also enhance the learner's contribution with the features previously discussed such as automatic archiving and user selected categorisation. Because the process of reflection, organisation, categorisation and recall is utilised as part of the single act of writing a post to a weblog, weblogs can be said to accelerate the process of reflection. Again, it must be noted that the cultural norms of writing weblogs need to be understood and learners encouraged to write without the constraint exhibited by typical novice bloggers.

### **Community based learning**

Community based learning encompasses many of the learning functions of peer review and assessment already discussed and therefore is useful to assess in terms of educational development toward expertise. Setting up communal projects where learners collaborate and share their learning is an effective way of developing the peer assessment and reflection that has already been seen to be a demonstrable part of expertise. Research into community based learning has found:

“Students addressed that interrelated learning-appropriated goals, authentic projects, and an interactive learning atmosphere made them emerge as active, engaged learners.”  
(Yang H, 2001)

A key characteristic of community based learning is the explicit goal of collaboration and sharing of knowledge (Yang H, 2001) and this requires the teacher to facilitate this environment to maximise student interaction with a sense of community:

“Teachers must attend to designing classroom activities and helping students organise their work in ways that promote the kind of intellectual camaraderie and the attitudes toward learning that build a sense of community...”  
(Bransford J, Brown A, Cocking R, et al, 2000)

These activities can include the class developing a portfolio of their collaborative work, collaborating on a group project and other activities. Weblogs again offer a significant educational benefit to the teacher, as weblogs can include multiple authors and by default,

offer time and date stamping of posts, categorisation. Weblogs also allow for the collaborative assessment through their comment system that is so important to reflective learning.

The social nature of weblogs, with the emphasis on sharing information, and commenting on existing posts also lends itself fully to the needs of community based learning. As one recent blogger, author Steven Johnson has commented:

"I've actually been about twice as productive as normal since I started maintaining the blog...it seems to me like a kind of intellectual version of going to the gym: having to post responses and ideas on a semi-regular basis, and having those ideas sharpened or shot down by such smart people, flexes the thinking/writing muscles in a great way"  
(Johnson S, 2002)

The default behaviour of weblogs mean that the setting up of a learning community and critically, the management, capture and assessment of the resultant information, result in weblogs acting as a fast, effective tool for community learning. Due to the development toward expertise resultant from community based learning, weblogs are identified in this case as facilitating the acceleration of expertise.

## **Assessment**

To thoroughly test the thesis that weblogs can accelerate the development of expertise would require the controlled observation of emergent learning between a control group learning with the aid of weblogs and another control group without. That level of research is beyond the scope of this assignment, and so is regrettably not to be investigated.

However, it is hoped that the arguments that weblogs do, in fact, accelerate the learning processes leading to expertise, remain compelling, at least theoretically. As there have been a number of examples of weblogs shown, and the ways in which weblogs assist the learning process documented, it is entirely possible to outline objectives for a theoretical implementation of weblog assisted learning and to determine the desired behaviours, from both students and the weblog itself.

Using Bloom et al’s taxonomy of educational objectives (Bloom et al, 1956) as a basis, it is possible to identify the levels at which one could be expect to see certain demonstrations of learning behaviour from both students and interestingly, the weblog itself.

For illustrative purposes, I have developed a brief learning outcome in which to frame the hypothetical test:

“Given an example collaborative project, students should demonstrate the results and process of their work within the environment of a project weblog, demonstrating peer assessment, self-reflection, and categorisation of their work. In addition, students should demonstrate mastery of the weblog environment by successfully developing interlinked posts.”

In order to show the proposed attainment of levels, according to Bloom et al’s taxonomy (Bloom et al, 1956), it is most efficient to display the information graphically.

Student, skill demonstrated:	Competence:	Weblog, skill demonstrated:
Recall basic facts Quote parts of student posts Produce lists of facts Create weblog entries	Knowledge	Recall basic facts Quote parts of student posts Produce lists of facts
Summarise group discussions Associate related weblog posts from searches	Comprehension	Summarise group discussions Associate related weblog posts
Determine new relationships between peer entries Create new categories within weblog Constructively critique a classmate’s work	Application	Determine new relationships between peer entries
Analyse own work and comment Identify commonality between different classmate’s work	Analysis	Identify commonality between different classmate’s work
Form new opinions by using classmate’s work as basis Research web for related work to own Find and display web based information from a number of sources and present within context	Synthesis	Research web for related work Find and display web based information from a number of sources and present within context
Critically assess own work and peer; Create structured arguments based on findings	Evaluation	None

Although the example objectives given are brief, it is possible to understand how weblogs can demonstrate, on a very simple level, emergent behaviour similar to that on the lower

levels of attainment for the students themselves. Indeed, the more posts and meta information that is entered into the weblog, the more value it delivers, by developing deeper and wider displays of relationships, simply due to quantity. It is also interesting to note that deeper, more reflective attainment of competence levels by the student such as recognising patterns, research, comparison, critique and reflective analysis can be facilitated through the direct manipulation of the weblog software and the metadata it holds.

There are significant issues with this classification. The utility of the weblog environment is directly reliant on semantically correct, carefully structured metadata and other relevant information. This requires significant skill and effort on the part of the learner. Weblogs, as has been seen, can offer significant boosts to those learners who wish to demonstrate aptitude toward expert-like behaviour. A classification of emergent, learner-like behaviour, whilst interesting, doesn't reveal the true utility of weblogs as a learner's fast 'outboard brain' (Doctorow C, 2002)

## Conclusion

Weblogs offer a significant potential benefit to learners, by accelerating the learning processes that contribute to expertise.

The technical and social nature of weblogs enables them to be used in a number of pedagogically useful ways. Perhaps most usefully, the simple act of posting to a weblog satisfies a number of educational criteria such as semantic analysis and metacognition. The technical infrastructure of weblogs assists knowledge gathering with the creation of taxonomies and the automatic display of domain knowledge from other websites.

Usefully, weblogs also accelerate the development of expertise by assisting expert behaviour such as inferring previously unseen relationships between information and facilitating the reflection nature of learning. Weblogs can also provide a pivotal role in

<mailto:guy@guydickinson.com>



collaborative learning, where their technical and social features can enable rapid and effective group pedagogical activity.

Interestingly, weblogs can demonstrate, on a very simple level, emergent behaviour similar to that at the lower levels of attainment for students; inferring relationships between weblog entries and creating new relationships between information. This 'skill' however is completely dependent on learner input and the weblog remains, as it should, a useful learning resource that will assist and accelerate the motivated learner toward expertise.

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