

Technically Speaking: A case for the Drupal Content Management System

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Column

Introduction

Advances in Internet technology have changed the way educators approach the use of **CALL** resources. This is especially true for social network services (**SNS**) or community portals, valuable resources for both educators and learners to enhance learning inside and outside of a traditional classroom setting. However, if you are interested in adopting these technological innovations where do you begin? With numerous services available, making a choice of online resources to maximize student learning, or to provide opportunities for the development of independent or autonomous learning strategies can be daunting. One possible approach taken by many is to use freely available preexisting online applications (see for example, Mork, 2009a, 2010b; Rosszell & Brown, 2009), but is this the best approach? Consider some of the potential issues involved in adopting many of the popular Internet resources or websites for student use:

Accessibility of services: Will the sites always be accessible or available?

Damage control: If students post embarrassing or inappropriate content, how easy is it to fully remove it from the site?

Data access: How much control do you have over access to data? Who does the data belong to once it is submitted to the site?

Data display & control: How much flexibility does the resource provide in displaying the data? Once the data is on the site, to what extent can you actually work with it?

Data integrity: If anything happens to the data, are there backups? What happens in the event of a catastrophic data loss?

Economics: Assuming you've signed up for a free service, will it remain free? What's its revenue stream – if advertisement-based, are you inadvertently “exploiting user creativity for commercial gain” (Warschauer & Grimes, 2007, p15).

Features: Does the site do what you want it to, or are you forced to adapt your plans to suit the tools? Does it have too many/unnecessary features that are confusing or of little value to the user? Mork (2009a) in a consideration of the Multiply Social Networking Service illustrates this.

Integration: How many sites will your students need to use to be able to achieve the goals you have in mind? If multiple, is there any way of integrating user data between the applications to allow for a more seamless user experience?

Objectionable content: Could you be exposing your students to potentially offensive or harmful material, either directly through the site content, other users (see e.g. Mork, 2010b), or via onsite links?

Privacy: Could you be exposing students to any potential privacy issues or unwanted attention from other users?

Tracking progress: Can you easily follow your students' contributions to the site?

User coordination/inertia: How long will it take to get all your students signed up and operational on the site?

A further concern relates to the underlying aims for utilizing an online service (or any innovation for that matter.) In so doing, are you making the kind of mistake identified by, for example, Witte (2007) of conflating technological innovation with teaching innovation? Obviously the pedagogical aims of any activity should be behind the tools you utilize to realize the activity.

One of the main benefits of working with preexisting online resources is the exposure to authentic language they provide, along with a community of users using the language for meaningful, authentic communication. However, expecting learners to engage fully with a web resource in the target language may be too challenging for some learners, and could prove to be an alienating or even demotivating experience. And while the students may engage with other users of the community, will this be in positive ways, or will the students be at best occasional contributors posting from the peripheries with little or no deep or long-term participation?

A related problem here concerns the site interface – how complex is it to navigate; does it offer multilingual options to ease in new users? Finally, many online resources periodically introduce interface changes or update their features to attract or retain users. Can you expect this from the sites you want to use, and will this be an issue; after all these kinds of changes can prove confusing for experienced users, let alone for less confident

An alternative to using online services is to set up your own web-based framework for student use. A self-installed application can allow you and your users to either sidestep, or directly address, many of the issues above, and also provide you with more control in setting up a *pedagogical*, as opposed to a technological, innovation for your students. With the right kind of system, pulling in the authentic content from various other sites, and enabling the exposure to other users that makes so many web services attractive is fully possible, albeit in a more controlled or filtered manner. Furthermore, creating a resource that is exclusively *for*, as well as *reflective of*, your students will ideally provide a sense of ownership of, and a higher level of commitment to the resource than asking them to sign up for a third-party application. An excellent candidate here, offering entry-level functionality through to complex user-driven web communities is the open-source content management system (CMS), Drupal (<http://drupal.org>).

What is a Content Management System?

Content Management Systems, as exemplified by Drupal, are software packages enabling “an individual or a community of users to easily publish, manage and organize a wide variety of content on a website” (<http://drupal.org/about>). Common usage includes:

- ✧ information portals
- ✧ social networking/community sites
- ✧ education-based sites

The package itself usually consists of a number of scripts written in **HTML** as well a dynamic scripting language (predominately the **PHP** scripting language), and often embellished with JavaScript for added functionality, and **CSS** (Cascading Style Sheets) for theming. These are installed on a web server accessible via the internet or an intranet.

In the case of the Drupal CMS, the system is based around a lightweight, easy-to-install core, which allows for fast construction of basic websites, and a modular framework allowing for easy extensibility through the addition of user-contributed modules, themes, and scripting add-ons.

The extent to which content can be accessed by site visitors is highly configurable, meaning it is very easy to control which information will be displayed to all visitors to a site, and which information will only be accessible to users in certain authorized roles. Furthermore, the ways in which information can be presented or displayed to users is also highly configurable, making it possible to ensure users can easily access only what is relevant to them.

In actual classroom use, Drupal separates itself from other CMS through the emphasis it places upon collaboration. Blogging, forum posting, and content sharing are, in a real sense, built into Drupal. Drupal also incorporates controls that allow users to be slotted into roles; it would be technically accurate to state that Drupal views users as role-defined groups more than as individuals. Roles enable student collaboration as a class or in smaller groups while preventing interference from anonymous internet users. (http://praxis.technorhethoric.net/index.php/Using_Drupal_in_an_Academic_Environment)

Setting up Drupal

Installation of the system is in most instances a quick and straightforward process. It is covered in depth at <http://drupal.org/getting-started/install>; but the main steps are usually little more than uploading the Drupal package to your web server, creating a database, and running an automated installation script. Once the installation is complete, it is recommended to set up a cron job to regularly run a maintenance script. This may be the most challenging step for many users, but is important if you want to keep the search database up to date, check for system upgrades, rotate logs, and perform other useful automated functions.

Extending and modifying Drupal with modules and themes

“Out of the box,” the CMS comes with a number of pre-installed modules which can be easily enabled or disabled via the administrative section as required (see Figure 1); these allow for creation of blogs, forums, news-type posts, pages, and wiki-type books. Using a taxonomy system to tag content allows for easy content management, while the appearance of the site can easily be changed by setting up and altering the placement of content blocks and menu blocks, and via the themes that come supplied. Whilst this in itself is often more than enough to set up a basic site, the extensibility offered by its modular framework enables site creators to move beyond the basics to build powerful, complex online environments.

Increasing the functionality of your Drupal installation is usually as simple as installing and enabling a contributed module, of which thousands are available, with new additions made on a regular basis. The website <http://drupalmodules.com/> is a good place to get an overview of what’s available and what different modules do, as is of course the Modules download section on the official Drupal site: <http://drupal.org/project/modules>.

The layout and design of the site can be easily modified using third-party themes. Theming is a very powerful aspect of the system, with the use of content-type templates and “theme snippets” (short pieces of code) enabling control of data presentation from the page down to the individual page elements.

Essentials for site extension

It is impossible to predict exactly which modules you will find invaluable for your site, as every site has different aims and users with different requirements. However, it’s more than likely you’ll find the following very useful if you wish to extend your site beyond the basics:

Content Construction Kit (CCK). This module allows the site administrator to create new content types, which can then be used for posting and displaying site content. It extends the basic text-based content types that come with the standard Drupal installation and allows for further expansion of Drupal’s capabilities via associated modules. This enables easy integration of multimedia content into the site.

Views. This module provides a powerful front-end to allow the site administrator to create database queries to display site content in various ways. While complex to use, once you understand how it works it gives you immense flexibility in content presentation and integration (Figure 2).

Core - optional				
Enabled	Throttle	Name	Version	Description
<input type="checkbox"/>	<input type="checkbox"/>	Aggregator	6.15	Aggregates syndicated content (RSS, RDF, and Atom feeds).
<input type="checkbox"/>	<input type="checkbox"/>	Blog	6.15	Enables keeping easily and regularly updated user web pages or blogs.
<input type="checkbox"/>	<input type="checkbox"/>	Blog API	6.15	Allows users to post content using applications that support XML-RPC/blog APIs.
<input type="checkbox"/>	<input type="checkbox"/>	Book	6.15	Allows users to structure site pages in a hierarchy or outline.
<input type="checkbox"/>	<input type="checkbox"/>	Color	6.15	Allows the user to change the color scheme of certain themes.
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Comment	6.15	Allows users to comment on and discuss published content. Required by: Forum (enabled), Tracker (disabled), Advanced Forum (enabled), Forum Access (enabled)
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Contact	6.15	Enables the use of both personal and site-wide contact forms.
<input type="checkbox"/>	<input type="checkbox"/>	Content translation	6.15	Allows content to be translated into different languages. Depends on: Locale (disabled)
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Database logging	6.15	Logs and records system events to the database.
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Forum	6.15	Enables threaded discussions about general topics. Depends on: Taxonomy (enabled), Comment (enabled) Required by: Advanced Forum (enabled), Forum Access (enabled)
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Help	6.15	Manages the display of online help.
<input type="checkbox"/>	<input type="checkbox"/>	Locale	6.15	Adds language handling functionality and enables the translation of the user interface to languages other than English. Required by: Content translation (disabled)
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Menu	6.15	Allows administrators to customize the site navigation menu. Required by: Administration menu (enabled), Menu Access (disabled), Menu Item Access (disabled), Administration menu Toolbar style (disabled)
<input checked="" type="checkbox"/>	<input type="checkbox"/>	OpenID	6.15	Allows users to log into your site using OpenID.
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Path	6.15	Allows users to rename URLs. Required by: Global Redirect (enabled), Pathauto (enabled)
<input checked="" type="checkbox"/>	<input type="checkbox"/>	PHP filter	6.15	Allows embedded PHP code/snippets to be evaluated.
<input type="checkbox"/>	<input type="checkbox"/>	Ping	6.15	Alerts other sites when your site has been updated.
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Poll	6.15	Allows your site to capture votes on different topics in the form of multiple choice questions.
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Profile	6.15	Supports configurable user profiles.
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Search	6.15	Enables site-wide keyword searching.
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Statistics	6.15	Logs access statistics for your site.
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Syslog	6.15	Logs and records system events to syslog.

Figure 1. The *modules* administration control panel

Organic Groups (OG). Allows you to set up separate user groups on your site which function as sub-sites, all of which can be configured in various ways separately from the main site.

Numerous other modules offer the same kind of functionality as many popular Web 2.0 social networking services, providing the option to create, for example, a Twitter-like micro-blogging system or Facebook-style “Friend” communities. With full control over the level of access and many of the parameters of these modules, you can effectively use Drupal to set up your own versions of these systems, allowing as much or as little integration with more public sources as you wish. The *Feed API* module lets you pull focused content from **RSS** or Atom feeds into your site, and work with individual feed items as regular site content. This provides students with access to the authentic content of the online services, but in a controlled manner. Similarly, other modules offer the possibility to integrate with many popular online services. This opens up the possibility for students to interact with the texts or multimedia content from these services in a variety of ways; for example commenting

on news stories or blog entries, sharing interesting content with peers, creating quizzes based on the content, writing blog posts about the material, and so on. A real option here is to use the content from third-party services as a bridge into the broader online communities, illustrating to the students the possibilities available if they wish to move beyond your particular online community.

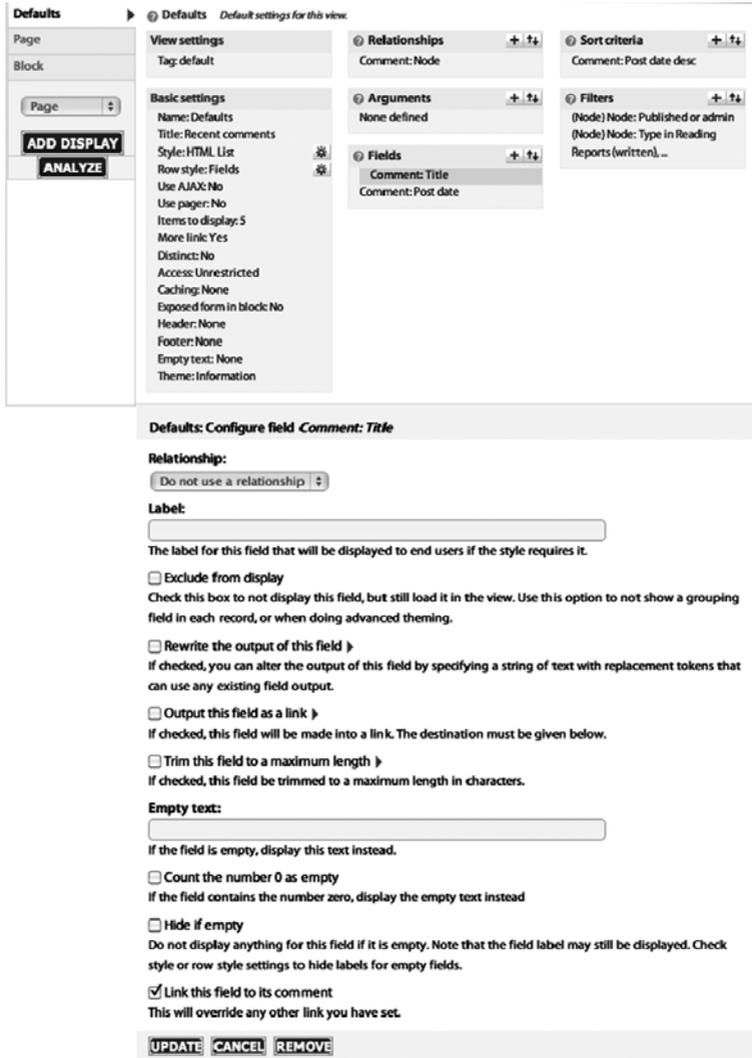


Figure 2. Views module interface

Keeping secure and up-to-date

Where there are concerns about confidentiality of student data, or protecting users from unwanted online attention, the Drupal permissions settings make privacy and data access easy to control, and can be set at multiple levels, restricting access to the entire site, specific groups of users, or even individual page elements (see Figure 3).

Permission	anonymous user	authenticated user	Admin	Forum Moderator	guest	Teacher	Tokubetsu 1	Tokubetsu 2
advanced_forum module								
administer advanced forum	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
view forum statistics	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
advanced_help module								
view advanced help index	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
view advanced help popup	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
view advanced help topic	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
audio module								
administer audio	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
create audio	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
download audio	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
edit own audio	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
play audio	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
view download stats	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
audio_attach module								
attach any existing audio file	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
auto_nodetitle module								
use PHP for title patterns	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
block module								
administer blocks	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
use PHP for block visibility	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
clone module								
clone node	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
clone own nodes	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
comment module								
access comments	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
administer comments	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
post comments	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
post comments without approval	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
contact module								
access site-wide contact form	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
administer site-wide contact form	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Figure 3. Permissions administration

With any online system, keeping on top of security updates and bug fixes is crucial for the safety and integrity of user data, in addition to the smooth operation of the system, and to protect the hosting environment from malicious attacks or unauthorized access. In this

respect the choice of Drupal takes some of the burden off the site administrators. Keeping track of updates to the system is as simple as enabling the core *status report* module, which indicates when new versions of the system and contributed modules are available along with the relative importance of the updates, and automatic notification of updates via email is easily configurable. The update process itself is both straightforward and relatively fast, usually just a matter of a few configuration steps in the administration section, replacing files on the server, and running an automatic database update script. Upgrading to new versions of contributed modules to take advantage of new features, scripting improvements, or bug fixes is a similarly trouble-free procedure.

If running a CMS like Drupal, you're not immune from the problems of data loss or corruption, but unlike using a public online service, you (should) have a high level of control over your data. As with any computer system, it's essential to ensure you have an efficient and practical backup system in place. As well as any database backup your hosting company provides, running your own regular database backups is advised. Here, the *backup and migrate* module is one solution, allowing you to set regular automated database backups that are saved to your server; several other modules offer other backup solutions. If you're running the site off an intranet, it becomes even more important to regularly back data up, and in all cases it is crucial to regularly check backups to ensure data is not corrupted.

User interface language

Another factor in Drupal's favor is the ease of creating multilingual sites, and of switching the user interface to a language to suit the users. Having the option to easily configure the site to enable users to switch to a language they are more comfortable with if encountering difficulties with navigating site content will certainly help increase accessibility and usability of the system.

Multiple sites

Another useful feature of Drupal is the possibility to set up multiple websites on a server running just one instance of the code base. Whilst not everyone has the need for this, it does mean that if you are interested in hosting more than one site on a server, you can do so relatively easily, reducing the maintenance time it might take otherwise.

Issues

Server requirements

To install Drupal, you do need access to an Internet-based webserver (or your institutional intranet). If your institution does not have the resources to allow this; or are concerned about installing third-party applications on their networks due to security concerns, a hosted server solution may be the only option – so some expense on your behalf may be inevitable. If you already have a server running (for example) Moodle, or WordPress installing Drupal should not be a problem, as it relies on the same server architecture.

If you just want to test Drupal and get a feel for what it can do, it is possible to set it up on your own desktop or laptop PC or Macintosh computer and run it locally; see Collett and Daniels (2008) for a guide to the configuration steps required.

Ease of use

While Drupal is easy to install and to set up to do the basics, it has been criticized for having a difficult administrative section, and a steep learning curve. The creators and maintainers of the system accept this criticism, and are working on improving usability with each new iteration of the **CMS**. Of course, as with anything, if you are willing to put time into learning to use the system properly you will discover you can get a lot out of it, but be prepared to spend time in the user forums or browsing the online help documentation.

Drupal and Moodle?

Perhaps invariably, a discussion of a web-based learning system will lead to how it relates, if at all, to the learning management system Moodle. While the two systems are based around different fundamental principles (see Fryer (2008) for an interesting discussion on the difference, and the strengths of each application), a number of modules are available to help integrate Drupal with a Moodle installation, offering a relatively seamless all-in-one Content and Learning Management System. Other modules such as the *Quiz* and *Gradebook* module are under development to provide Drupal with Moodle-like functionality, while an active community is involved in extending Drupal as a possible learning or classroom system (Drupal in Education, n.d.). It will be interesting to see where this takes the ideas of content, community and collaboration that lie at the base of Drupal.

Conclusion

Drupal is just one of a number of possible candidates to consider when looking into a self-contained environment for providing learning opportunities and linking members of your community (see for example, Swanson's (2010) introduction to the Elgg social networking application). The strengths Drupal offers lie in its robust framework, widespread user base, and low cost of implementation. All this enables you to use the system to build and experiment with your own online learning community rather than tying yourself into a preexisting application that may or may not be appropriate for your needs.

Resources

<http://drupal.org> Where to get started.

<http://drupalmodules.com> Guide to Drupal Modules with user reviews/comments, etc.

<http://themegarden.org/drupal6/> Allows you to preview different themes in use.

<http://groups.drupal.org/drupal-education> Drupal users group for those interested in discussing its use in educational contexts.

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