Learning *Online* Network with CAPA

Course Management Manual

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LON-CAPA Group

Michigan State University

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1 System Overview

The **L**earning**O**nline **N**etwork with a **C**omputer **A**ssisted **P**ersonalized **A**pproach (LON-CAPA) is an integrated system for online learning and assessment. It consists of a learning content authoring and management system, allowing new and existing content to be used flexibly; a course management system; an individualized homework and automatic grading system; data collection and data mining system; and a content delivery system.

In particular:

- Prepare Lectures
- Administering Homework
- Create & Share Resources

  The LON-CAPA software provides instructors with a common, scalable platform to assist in all aspects of teaching a course, from lecture preparation to administration of homework assignments and exams. It allows instructors to create educational materials and to share such learning resources with colleagues across institutions in a simple and efficient manner.
- Create Personalized Homework and Exams
- Use Summative Assessment Tools
- Wide Variety of Question Types

  It provides an extremely sophisticated assignment engine that can create unique homework assignments and examinations for each student in a class. Its formative and summative assessment tools grade a wide variety of objective problems and assist in the evaluation of essays.
- Get/Give Prompt Feedback
- Review Performance Statistics
- Discussion Boards

  Provides prompt feedback for students and instructors, as well as statistical information on performance and on effectiveness of materials. Discussion pages attached to every homework assignment encourage communication among students and faculty.

The LON-CAPA software is freely available and free (GNU General Public License), and may be modified and adapted.

LON-CAPA is being developed and implemented by an enthusiastic group of faculty and professionals who recognize that information technology can play an important role in improving students' learning and understanding. Current members of the project include faculty from universities, colleges, and K-12 schools in the US, Canada, Asia, Africa, and Europe. The core development group is located at Michigan State University.

2 Help

2.1 Online Help

On many LON-CAPA pages, you will see one or more small blue circles (each with a white question mark inside) . These blue circles are links to relevant help documentation. Each LON-CAPA help page also includes a search box, in which you can enter keyword(s) to search all LON-CAPA help documents.

Also, a **Help** link is available in the upper right. This help page provides links to the course manual (from within a course) or the author manual (from the authoring space) and provides both an online version and pdf version. You may wish to save a pdf version of each so that you can reference the help for one role while working in the other role. The help page also provides a link to request help from the LON-CAPA help desk and a link to report bugs (Course Coordinators and Authors only). In some cases you may also see a green square containing a white question mark alongside the text: "FAQ". This provides a link to relevant help item in the user-contributed documentation found in the LON-CAPA FAQ-o-matic system.

2.2 Where to Find Additional Help

You can find additional help about LON-CAPA and download copies of this manual at `http://help.lon-capa.org` . For additional help, use the **Help** link on the upper right of the screen to find a link to contact the helpdesk, or search the loncapa listservs at `http://mail.lon-capa.org/mailman/swish.cgi` . You may wish to join the listserv loncapa-users at `http://mail.lon-capa.org` . The family of users is very helpful in assisting users with questions posted to the listserv.

2.3 Requesting New Features and Submitting Suggestions

We Welcome Your Ideas and Contributions...

LON-CAPA is open-source software where everyone is free to contribute to the development. If you think of an enhancement, or find a bug in the system, please report it. LON-CAPA uses Bugzilla (`http://www.bugzilla.org/`) to report and track bugs and enhancement requests. All reported bugs and enhancement requests posted on Bugzilla are examined by the core LON-CAPA team. Having the request in Bugzilla helps keep track of both bugs and feature requests, and is the preferred method of reporting bugs and requesting enhancements. You'll be able to see how the developers respond to the bug, which developer is currently responsible for it, and what the developer's intentions are.

You must have an account to use Bugzilla. You can create an account at `http://bugs.lon-capa.org` by clicking on the link **Open a New Bugzilla Account**. You will be directed to send an e-mail to the LON-CAPA Helpdesk to request creation of a Bugzilla account. Once you have an open account, please search existing cases for related content before submitting a new case. Select "LON-CAPA" in the "Product" category when searching. Hold the Ctrl key while clicking multiple items. The "Component", "Version", and "Target" can be left undesignated. If you find a related bug, you can add comments

instead of reporting a new bug. If you find a bug that you are interested in following, you can add your e-mail to the "Add cc:" box and click "Commit".

You can report a bug or request an enhancement as follows:

1. Open the web page `http://bugs.lon-capa.org`
2. Click on the **Enter a new bug report** link.
3. Select the (LON-CAPA) product link.
4. At the login screen, enter your e-mail address and password.
5. Click the [Login] button.
6. Select the LON-CAPA Version, Component, Platform and Operating System (as much as known).
7. Enter a summary in the "Summary" text box.
8. Enter a description in the "Description" text box.
9. Click the [Commit] button.

A developer will follow up with you.

3 Logging In

3.1 Roles Screen

After logging into LON-CAPA with your username and password, you will see a screen where you can select your ROLE. LON-CAPA is a roles-based system. You can always use the same login even though your roles may change. You can be an instructor in one class, a TA for another class, and an author of resources – all with the same username. Selecting **Roles** at the top right of a page, or **Switch to another user role** on the Main Menu page will bring you back to the **Roles** screen.

Two main types of Roles exist in LON-CAPA: Authoring Roles, and Course Roles. Authoring roles are used to develop learning resources. The course role is where resources are inserted into courses. You may have multiple instances of either type of role. For example, each separate course has a course role. You may make use of more than one authoring space role depending on your involvement in collaborative LON-CAPA content creation.

3.2 Inline Menu and Remote Menu

Default Inline Menu

By default, LON-CAPA is controlled by a combination of the Inline Menu and the Main Menu. The Inline Menu will appear at the top of every page in LON-CAPA. Click on the **Main Menu** link within the Inline Menu to access the Main Menu.

Figure 1: Author Remote Control

Remote Control

LON-CAPA also offers a **Remote Control** menu. The Remote Control is a separate pop-up browser window, and is automatically sized and placed in the upper left of the screen. To enable and experiment with the Remote Control menu, navigate to: Main Menu > My Space > Set my user preferences > Content Display Settings > Launch Remote Control. To exit from the remote, either close the window, or look for the inline menu command to exit on the upper right of the parent browser window.

Hints for each button appear when hovering over the buttons. Click the words *Extended Display* immediately above the remote command display to obtain a list of hints.

The commands on the remote change depending on whether you are in a authoring space role or course role. Some of the important commands on the Remote Control are:

- **ROLES (CHOOSE ROLE)** allows you to select which user role to assume for this session.
- **COM (COMMUNICATION)** allows you to access the communication functions in the system.
- **CUSR (USER ROLES)** brings up a page that allows you to create new users and change user privileges.

- **AUTH (AUTHORING SPACE)** displays the authoring space for your account.
- **RES (RESOURCE SPACE)** allows you to browse the LON-CAPA network directory.
- **SRCH (SEARCH LIBRARY)** brings up a screen that lets you search the LON-CAPA resources using multiple criteria.
- **PREF (PREFERENCES)** brings up a screen that allows you to change some preferences.
- **EXIT (LOGOUT)** will log you out of the LON-CAPA system.

4 Setting Preferences

4.1 The 'About Me' Personal Information Screen

When you communicate with other users in the system, your name appears as a link to your Personal Information Page.

To change this internal LON-CAPA information page, do the following:

1. Either move your mouse pointer over your name at the top left of the page, and select **Information** from the displayed dropdown, or click **Main Menu** on the Inline Menu and Select **Set user preferences** in the **My Space** group then select **Personal Information Page** This will bring you to your Personal Information Page.
2. Click the Edit link in the Functions menu.
3. To upload an image to your Personal Information Page, click the Browse button in the editor and grab an image from your computer. When you have made your selection, click the Upload button to save the image to your Personal Information Page.
4. Clicking ANY of the Save All buttons will save the entire page.

For more information about editing template files, see the "Editing Template Files" section (5.4).

NOTES

1. If you choose to communicate anonymously within the course, students will not be able to view your Personal Information Page through the normal link, but Course Coordinators will still be able to view the page through the normal link.
2. The **My Personal Information Page** is a special page; it belongs to you, not a particular course. Contents of that page remain the same no matter how many times it appears. All changes made to the page propagate to all links. Bear in mind, as populating your **My Personal Information Page** for multiple courses, you may not wish to add course-specific information.

4.2 Change Password

Depending on how LON-CAPA is authenticating you, you may be able to change your password.

To change your password, do the following:

1. Either select **Preferences** from the dropdown list displayed when you mouseover your name at the top left of the screen or click **Main Menu** on the Inline Menu and then select **Set user preferences** in the **My Space** group
2. At the **Set User Preferences** screen, select **Password**.
3. Type your current password in the **current password** text box.
4. Type your new password in the **new password** text box.
5. Re-type your new password in the **confirm password** box.
6. Click the Save button.

If you cannot change your password, please use the Help link at the top right of the page and then click "Ask Helpdesk" to submit a help request to ask for instructions. University users often authenticate against the campus-wide system. For those users, changing the password used by LON-CAPA means changing the user's campus-wide password. Your helpdesk will be able to tell you how to go about that.

4.3 Nickname and Anonymous Discussion Screen Name

To create or change a screen name or nickname, do the following:

1. Either move your mouse pointer over your name at the top left of the page, and select **Preferences** from the displayed dropdown, or click **Main Menu** on the Inline Menu and then select **Set user preferences** in the **My Space** group.
2. At the **Set User Preferences** screen, select **Screen Name**.
3. Type your new screen name in the text field labeled **New screenname (shown if you post anonymously)**.
4. Type your new nickname in the text field labeled **New nickname (shown if you post non-anonymously)**.
5. Click the Save button.

Note: When using post anonymously, the username is hidden from students and only visible to course coordinators.

4.4 Message Forwarding and Notification Address

Message Forwarding for Users with Multiple LON-CAPA accounts

If you have multiple LON-CAPA accounts and wish to receive all communication in one account, set LON-CAPA to forward messages sent to your other accounts to the single account where you wish to receive your aggregated messages. You can forward messages to more than one account.

To forward messages do the following:

1. Either move your mouse pointer over your name at the top left of the page, and select **Preferences** from the displayed dropdown, or click **Main Menu** on the Inline Menu and then select **Set user preferences** in the **My Space** group.
2. At the **Set User Preferences** screen, select **Messages & Notifications**.
3. If you wish to send all your LON-CAPA messages to a single LON-CAPA account, type your desired forward address in the text field labeled "Forward to account(s)" in the **Forwarding messages to other account(s) in LON-CAPA** section. This should be one or more LON-CAPA addresses, in the form: "username:domain", separated by commas.
4. Click the Save button.

Receive an external e-mail notifying you when a LON-CAPA message is sent to you

LON-CAPA can send new message notifications to your conventional e-mail accounts. You can choose the specific types of messages which will cause notifications to be sent to the e-mail addresses you provide. The specific types of message are: critical messages, standard messages or any message. The notification e-mail will include an excerpt of the text contained in the body of the original LON-CAPA message.

To receive notification e-mail do the following:

1. Either move your mouse pointer over your name at the top left of the page, and select **Preferences** from the displayed dropdown, or click **Main Menu** on the Inline Menu and then select **Set user preferences** in the **My Space** group.
2. At the **Set my user preferences** screen, click the Message & Notifications link in the **Messages & Notifications** group.
3. In the **E-mail notification of LON-CAPA messages** section, check the checkbox labeled **Add new address**
4. Type a notification address into the text field labeled **Notification address**. This should be an Internet e-mail address like `user@example.com`

5. Use the radio buttons to select which types of LON-CAPA message should cause a notification e-mail to be sent to the specified address. (See the Critical Messages section 13.5)

6. Choose whether you want any HTML tags contained in the original message body to be preserved in the excerpt included in the notification e-mail.

7. Click the [Save] button.

8. Repeat this procedure to add more notification e-mail addresses, one address at a time.

4.5 Change the Way Discussion Posts are Displayed

In a discussion board or resource in which there has been discussion, display settings will determine: (a) which posts are displayed, and (b) which are marked as 'NEW'.

The default is for all posts to be displayed, and for new posts to remain marked as 'NEW' until you explicitly mark them as read.

You can set a personal preference that will apply to your display of *all* discussions in *all* courses. If you change the display settings in an individual board or resource, by using the **Change** link beneath the postings, those settings will override the default or a global preference you set using your **Set user preferences** screen. To set/change your global discussion display preferences:

1. Either select **Preferences** from the dropdown list displayed when you mouseover your name at the top left of the screen or click **Main Menu** on the Inline Menu and then select **Set user preferences** in the **My Space** group

2. At the **Set User Preferences** screen, select **Discussion Display**.

3. Check one or both 'Change' checkboxes in the **Action** column.

4. Click **Save**.

4.6 Color Scheme

To change your color scheme preferences, do the following:

1. Either select **Preferences** from the dropdown list displayed when you mouseover your name at the top left of the screen or click **Main Menu** on the Inline Menu and then select **Set user preferences** in the **My Space** group.

2. At the **Set User Preferences** screen, select **Color Scheme**.

3. Click on the [Color Picker] next to the description you wish to change.

4. At the pop-up window, select a color and click the [OK] button to confirm your choice.

5. Repeat steps 3 & 4 as necessary for the other colors.
6. Click the Save button to save your changes.

NOTE: To restore the colors to the default scheme, click the Reset All button.

4.7 Language Preferences

To change your preferred language, do the following:

1. Either move your mouse pointer over your name at the top left of the page, and select **Preferences** from the displayed dropdown, or click **Main Menu** on the Inline Menu and then select **Set user preferences** in the **My Space** group.
2. At the **Set user preferences** screen, select **Language**.
3. Select your preferred language from the list of available languages.
4. Click the Save button.

Most likely you will have English as the default language.

If homework problems or other resources are available in your preferred language they will be displayed to you in that language. Otherwise they will remain in the language they were coded in. Course Coordinators can enforce a particular language to be used in their course. This will override the preferred language settings of all course members for that particular course.

Within LON-CAPA the default language of the user interface is English. User interfaces for other languages might not be translated completely, in which case untranslated words will appear in English. If you would like help with a language that is not completely available or not available at all from the language list, please submit a help ticket through Bugzilla.

4.8 Storing Links

A personal Stored Links library is only available for users with access to the resource-pool. To access your Stored Links either move your mouse pointer over your name at the top left of the page, and select **Stored Links** from the displayed dropdown, or select **Main Menu** from the inline menu and select **Stored Links**. This function provides the ability to save links to resources in the shared resource-pool or to links to external websites. Links are stored in a hierarchical folder structure, and must contain a title and a path. They can be stored in two ways:

1. When viewing a resource, Stored Links is offered to automatically save a link for this resource.
2. A link can be manually saved by inserting the required information in the stored links library.

Folders (which you name by entering a title) can be used to structure the list. Both links and folders can also be annotated, for example to describe their contents. Stored Links includes functions to modify the hierarchical structure within which your links are saved. To support this, Stored Links operates in two distinct mode: view-mode and edit-mode. The view-mode is selected by clicking on in the **Function** bar of the Inline Menu. It contains the following functions:

1. Click to add a new link to your Stored Links by manually inserting a title, a path and an optional note.
2. Click to add a new folder to your Stored Links by inserting a title and an optional note.
3. Click to view and edit notes.
4. Select links and folders via checkboxes to move them to another folder by pressing . Moving a folder means moving all content within this folder.
5. Select links and folders via checkboxes to delete them by pressing . Deleting a folder means deleting all content within this folder.
6. Click to save changed notes.

The edit-mode is selected by clicking on in the **Function** bar of the Inline Menu. It contains the following functions:

1. Click to add a new link to your Stored Links by manually inserting a title, a path and an optional note.
2. Click to add a new folder to your Stored Links by inserting a title and an optional note.
3. Edit the titles (and paths) of links and folders via textfields.
4. Click to view and edit notes.
5. Sorting links and folders within a directory-level using the select-boxes before the title.
6. Select links and folders via checkboxes to move them to another folder by pressing . Moving a folder means moving all content within this folder.
7. Select links and folders via checkboxes to delete them by pressing . Deleting a folder means deleting all content within this folder.

8. Click to save changed titles, paths and notes.

The links saved in your Stored Links can be imported into courses by accessing the **Course Editor**, selecting the **Import** tab and then using **Import from Stored Links**, see the "Inserting Published Content from Stored Link" section (7.5.3).

5 Exploring Your Course

By default, your new LON-CAPA course will be empty except for the syllabus. Select the Course Coordinator role to enter the course by clicking the appropriate Select button on the **Roles** Screen.

5.1 Course Initialization Helper

The first time you enter your course, you will see the Course Initialization Helper. Click the Next button on each screen to keep the LON-CAPA default settings. The helper will step you through the major settings:

- Course Title
- Disable Chat Room Participation
- Disable Discussion Participation
- HTML preferences for posts
- Course Feedback recipient settings. These settings configure the destination(s) for messages composed when students use the feedback link from the course menu bar or a resource. Be sure to include recipient(s) for at least one category. For more information see the Feedback Messages section (6.3).
- Course Cloning Permissions - configure who will be able to clone this course.

When you are done going through the Helper, click the Finish button, which takes you to the Course Editor screen. If you decide at a later time to change any course settings, use Settings > Course Settings (11.5) form the course toolbar.

By default, the first resource in the course will be displayed when the students log-in and select a student role in your course. If you would prefer to have the students see the table of contents, see the "Table of Contents" section (7.8.3).

5.2 Navigation Screen

Select **Course Contents** on the Inline Menu or **Table of course contents** from the Main Menu to explore your course. The **Course Contents** screen is a table of contents for your course that also displays due dates, status (i.e. solved versus unsolved problems), new discussion notification, and new message notification.

New discussion posts are indicated by a little speech bubble next to the resource name.

New messages from individual students are indicated by a little envelope next to the resource name. Clicking on this icon displays the message.

Clicking on any resource jumps you to that resource.

Clicking on a folder icon opens up the folder, showing a list of all the resources inside that folder.

For Course Coordinators clicking the little wrench to the right of a folder's name will open the Course Editor for that specific folder.

Several tools are available to modify the appearance of **Course Contents**, e.g., by showing the first due problem, showing only uncompleted problems, opening all folders etc.

Unless the course is empty, or all content is hidden (except Course Coordinators), a tool will be available to jump to generate PDF printout(s) of resource(s) in the course. Course Coordinators and other course personnel with the right to create PDF printouts for others in a course will be able to jump to generation of PDF printouts for bubblesheet exams for their students.

Course Coordinators will also see a tool which jumps to the Course Editor.

5.3 Edit Syllabus

For Course Coordinators, the inline menu includes a **Public** dropdown item containing selections for Syllabus and Feeds. For all other course participants, the inline menu will include a **Syllabus** item, unless the Syllabus has been included in the course's Content area, and items have been added to it. There is also a link to a course's syllabus for each course listed on a user's **Roles** screen.

The main effect of including a Syllabus item explicitly within course content is that students will be able to generate a PDF for printing using LON-CAPA's print utility. If, on the other hand, the syllabus is not added to the contents, but instead remains as an item in a student's inline menu, students will need to use a browser's own printing support to print it.

When you select "Syllabus" from the **Public** dropdown a syllabus page will be displayed containing the current syllabus style specified for your course. By default, this will be the standard template, which includes a listing of Course Personnel (and their roles in the course), and any fields which have been completed previously using the Syllabus template.

By default, a syllabus item will have been placed in your course's Main Content area when your course was created (unless it was cloned from an existing course). You can use the Remove link for this item in the Course Editor if you do not wish to have the syllabus included within the Main Content.

To edit the syllabus select **Edit** from the Functions menu.

Your choices for the syllabus are:

- **Minimal template** Use the Rich text editor to create a single HTML document, including formatting etc. You can include image files by clicking the image icon in the text editor (second row of buttons, fourth from right). In the Image properties pop-up enter the file name. Click "Save and Edit" or "Save and View". If you have included

an image, click LON-CAPA's Manage Dependencies button to display a screen where you will be prompted to upload the image file.

- **Standard template** Fill in one or more of the text boxes and click any of the Save All buttons to save changes to your syllabus. By default, users with non-student roles will be displayed in a table at the top of the syllabus. You can either uncheck display of this item entirely, or choose which course personnel and/or roles will be displayed.

- **External URL** Enter a web address in the text box. Use the Preview link to preview the page, and the Save button to save it.

- **Uploaded file** You can upload a file (e.g., a PDF or HTML file) if you have already created a syllabus document. Click the Browse button to locate the file, and the Save button to save it.

Clicking the **Exit Editing** link will show you you how the syllabus will look when viewed by your students. You can copy the URL of your syllabus and distribute it to anyone. The syllabus is publicly viewable and anyone can see it, even without logging into LON-CAPA.

5.4 Editing Template Files

Within the range of types of material that may be added directly to a course are a number of content types which you will create using templates. To edit such templated pages:

- Either enter the **Course Editor** and use the Edit link for the item or use the **Edit** item in the Functions menu when displaying the content.

- Each template behaves in much the same way: Several labeled fields are provided, with text boxes below them. Fill out the ones that apply to your course. Leave the rest blank, and they will not be displayed to students.

- Click one of the Save All buttons to save your work. When you click the Save All button, *all* changes made to any textbox on the screen are saved. Thus, you do not need to click the Save All button for every single textbox; the Save All buttons are shown next to each box for your convenience only.

To see how the page looks without the text boxes, click the **Exit Editing** link in the Functions menu just below the top of the screen. This will show you how the page looks to everyone else.

6 Course Settings

Primary course settings are accessed via the **Course Settings** panel.

To access the Course Settings panel, either select Course Settings from the dropdown list displayed when you mouse over **Settings** in the inline menu, or

- Click **Main Menu** on the Inline Menu

- Click **Modify Course Settings** in the Course Management group

Each of the categories is described briefly below.

6.1 General Course Settings

This panel lets you set and see some general options for your course:

- Owner and Co-Owner of the course or community: owner is set by your domain administrator; co-owner(s) can be set by Course Coordinator (owner), unless set automatically from institutional data.
- Minimum LON-CAPA version required: some items in your course may require a certain minimum version of LON-CAPA to function. The Details link shows you which items are responsible for any version requirements.
- Cloned From: the title of the course from which the course was originally cloned when it was created.
- Course/Community Description: the name under which your course or community shows up on Roles screens.
- Course ID or number: an optional internal identifier for your course, usually the course number and semester.
- Categorize course: if your domain has been configured to allow Course Coordinators to choose the categorization used for their course on the publicly available course/community catalog page, there will be a Display Categories link to allow you to set that.
- Syllabus status: shows the syllabus type currently in use, and includes an Edit link which loads the syllabus editing page, and a View link which shows the syllabus.
- Users allowed to clone course/community: here you can set rules for which users are allowed to create copies ("clones") of your course/community.
- Replacement titles for standard course roles: if you want the names of roles to be different from those used by default, enter alternative names in the table.

Click the Save Changes button after making any changes to save them.

6.2 Language and Time Localization

This panel lets you adapt the language and date format of your course:

- Language used: whatever you set here overrides both user and institutional settings, i.e., it forces a certain interface language on all users in the course.

- Timezone: allows you to set the time zone in which the course runs, which overrides the time zone of your institution. If a course time zone is set, there is also an option to set whether the course time zone should override an individual user preference (if set to be available for a particular user, at a domain level).

- Locale used for course calendar: determines which day is considered the first day of the week when displaying the calendar (course announcements etc.) for a course.

6.3 Feedback Messages

LON-CAPA allows users to send messages to course staff via the Send Feedback link at the bottom of most content pages in a course. This requires recipient(s) to have been set for those messages.

If a recipient is defined for a message type: by default named – Resource Content, Course/Community Content or Course/Community Policy – a user will be able to select that message type, when composing the message.

The message can be routed to different course staff according to section membership, as well as message type.

Lastly, the default names for the different types of message can be replaced with custom wording using the bottom three rows in the Feedback messages configiration screen.

6.4 Discussion and Chat

This panel lets you control who gets to participate in discussions and the chatroom. Participation can be role-based and/or set for specific course users.

You can also control if discussion entries can be "marked up" using HTML, e.g., boldface or italic, etc.

And you can also control if users can edit or delete their own postings.

Finally, you can set styling (boldface, size etc.) to use for posting which have been liked, or unliked, for discussions where you have chosen to allow voting on discussion posts. (Voting itself is enabled via Content Settings).

6.5 Classlists and Course Access Dates

This panel is used to configure the following:

- Default start and end dates for student access (these will apply when additional students are added to the course). To change access dates for existing students, select the "List and Modify Multiple Course Users" item from the user management page.

- Default credits for enrolled students (if different from any domain default).

- Which course users with administrative roles (i.e., Domain Coordinator) to include in a Course Coordinator's "List and Modify Multiple Course Users" screen, and (by default) in the standard Syllabus.

- Options for a student-viewable classlist: if enabled, a "People" item will be included in the inline menu for students. Additional options are to restrict listings shown to those in the viewer's section, and to make display in the classlist dependent on an opt-in by each listed student.

6.6 Display of Resources

This panel lets you set various display options for content.

- Default XML style sheet
- Visibly Separate Items on a Page
- Disable Display of Problem Receipts
- Force use of a specific math rendering engine
- Set default options for <m> tags when converting LaTeX to html.
- Student formula entry uses inline preview, not DragMath pop-up
- Molecule editor uses JSME (HTML5) in place of JME (Java)
- Chemical reaction response uses inline preview, not pop-up
- Display of external resources

Style files (.sty extension) created in Authoring Space and published to the shared content pool can be selected for use when rendering resources in the course by clicking the Select Style File link. See the "Resource Types" item in the "Introduction to LON-CAPA Authoring" section in the Authoring manual for more information about .sty files. An alternative to the use of .sty files is to create a CSS file (.css extension) in Authoring Space, and publish to the shared content pool. Note: in this case you would use a problem parameter "CSS file to link (cssfile)", accessed via Content Settings, instead of Course Settings, to apply the style to resource(s) in your course.

Composite Pages include two or more resources on a single web page. By selecting "Yes" for visible separation, adjacent resources will be separated by a horizontal rule.

Problem Receipts will be displayed by default when feedback on correctness is being displayed to a student, and the student has submitted the correct solution. See the "Verify a Submission Receipt Number" section (16.4).

If "Force use of a specific math rendering engine" is set to none, then the math display mechanism used to render LaTeX within ¡m¿¡/m¿ tags is determined in the following order, with the first one set being the one in effect:

1. User's own personal preference set by the user hovering over the user's name at top left of a LON-CAPA page, and selecting Preferences > Math display settings
2. Domain default set by a Domain Coordinator

3. System default set for the LON-CAPA version installed on the server (tth in 2.11 and earlier)

This can be overriden by setting the attribute display to one of **MathJax**, **mimetex** (i.e., Convert to Images) or **tth** (i.e., TeX to HTML) which will force a specific display mechanism.

The behavior of the textboxes where students enter either an algebraic formula (formularesponse) or a chemical reaction (reactionresponse) is inherited from settings in the domain. The default, in the absence of a specific domain setting, is to use an inline preview which appears below the textbox, as the expression is typed. The domain default can be overridden within a specific course if it is preferred to use the old pop-up window displays in either case.

Similarly, the the molecular editor display will use the domain setting, unless overridden within a specific course. If nothing is explicitly set in the domain or the course, then the default is to use JSME instead of its JME predecessor.

The Course Editor can be used to add the URL for an external resource to be displayed within a LON-CAPA course. By default, the remote content will be displayed in an iframe with standard LON-CAPA menu links/icons present in the page header above the resource. LON-CAPA attempts to gracefully handle mixed active content issues for external resources by injecting usehttp=1 into the query string for the LON-CAPA URL, in order to force serving of an http:// external URL in an http:// LON-CAPA page, where the LON-CAPA server uses https:// by default for all other pages. A separate session cookie which confers reduced rights is used when usehttp=1 is present in the query string because LON-CAPA's standard session cookie includes the 'secure' attribute.

LON-CAPA also attempts to circumvent the lack of scrolling for multi-page PDFs in iframes on iOS by replacing inline display in an iframe with a link when viewing on a mobile device. Another instance where LON-CAPA replaces display of an external resource in an iframe with a link to display the resource in a separate browser tab is when Content-Security-Policy or X-Frame-Options prevent display in an iframe.

The automatic display adjustments described above occur on a case-by-case basis depending on the external resource itself.

The "Display of external resources" item can be used to force display of all external resources in a course in either a separate browser tab, or in a new browser window. In the latter case an optional width and height (in pixels) can be specified. When tab or window are selected, there is also an option to re-use the same (named) tab or window when displaying different external resources in a course in order to limit the number of tabs or windows which may be created by browsing in a single course.

6.7 Grading

This panel lets you choose how grades are displayed to students.

There are different "gradebooks" available:

- Standard: points are calculated by multiplying the fractional credit on a problem (part) with its weight, and added by folder
- Categories: points are calculated by multiplying the fractional credit on a problem (part) with its weight, and added according to categories set by the Course Coordinator.

Categories in turn have different weights toward the overall course points.

- External, shows number number of completed parts and totals: shows only the number of sucessfully completed problems or problem parts and totals by folders - typically used when grades are calculated external to LON-CAPA.
- External, shows only number of completed parts: like above, but does not even calculate totals.
- Spreadsheet: the LON-CAPA-internal spreadsheet.

In addition, use of significant digits when grading numerical problems can be disabled from this panel.

Two additional settings available in this panel can be used to change the algorithms for (a) Receipt creation, and (b) Randomization. It is unlikely you would need to change those, and indeed you should avoid changing the Randomization algorithm once the course is in progress, and students have made submissions to assignments.

6.8 Printout Generation

This panel lets you set various options for the generation of PDF files.

- Allow problems to be split over pages (default is "no")
- Suppress number of tries in printing (default is "no")
- Default paper type (default is letter, i.e., 8 1/2x11 in).
- Print header format (default is "name" "course description" on first header line, resource/folder title on second header line).

  Whenever you set at least one item, in the "Print header format" it eliminates display of LON-CAPA's default header. In the "Print header format" select what you would like to enter. There are two types of item:

  1. Substitution

     A "substitution" item means whatever you chose from the dropdown list will be included with the value appropriate for that student. The choices are: student name, course ID or assignment note.
  2. Text

     A "text" item means the text you enter in the textbox will be included in the header.

  You can enter as many of each type of item as you like (although you are only offered "New" substitution item or a "New" Text item each time – to enter many you need to add one, click "Save Changes" then add another etc.)

  The dropdowns: $< 1 >< 2 >$ etc. can be used to re-order the items in the header.
- Disable automatically printing point values on bubblesheet exams (default is "no")

6.9 Menu Display

The Menu display panel in Course Settings can be used to define different collections of menu items which will be included in the header and footer sections when displaying LON-CAPA content in course context. Each collection is modifiable, and the interface supports definitions of multiple collection(s) in a course. Each collection definition is assigned an integer identifier starting at 1. Once a menu collection has been defined, it can be set to apply as the default collection of menu items shown in the course. If no numbered menu collection is set as the default, then the standard set of menus (i.e., all items the current user's role is permitted to see) will be shown.

Besides the ability to set a non-standard set of menu items as a default for the course, a numbered menu collection can also be selected as the sixth option when setting the "Deep-linked items" (deeplink) parameter at a resource or folder level via Settings > Content Settings.

When a particular collection is specified in a deeplink parameter, then the menu collection in effect for the "deep-linked" resource originally accessed when first launching the current LON-CAPA session via a deep-link (e.g., by a following a link to a short URL in a web page external to LON-CAPA) will be the default for the session. In this context the default menu collection for the course will be overridden by the collection set for the "deeplink login" for the duration of the session, i.e., until logout, or the browser window is closed, and a direct log-in to LON-CAPA is used.

Note: if a resource is accessed which is different from the original "deeplink login" target used to launch the session, but is still displayable, under the scope rules of the original deep-link login, then if that resource has a deeplink parameter in effect which specifies a different numbered menu collection from the one in effect for the 'deeplink login", then the collection in effect for the resource itself is the one which will apply when displaying that particular resource.

Each menu collection definition contains five main items:

- **Hierarchy** If a checkbox is checked for one of four menu areas, that area will be included in the rendered page. Areas are:
  - Header - the first row of menus on a LON-CAPA page which can contain name, role, course title, and links to non-course-specific functions.
  - Inline menu - the second row of menus on a LON-CAPA page which can contain links to course-specific functions (Content, Grades, Groups etc.)
  - Footer - the last row of function items on a LON-CAPA page which can contain links to Post Discussion or Send Feedback.
  - Main Menu - the separate LON-CAPA main menu page, which can be launched by clicking 'Main Menu' from any LON-CAPA page.
- **Text** Items (name, role, course title) shown in the first row of menus, and communication links shown in the page footer.
- **Header links** Links shown in the first row of menus which include:

  - Drop-down list of "Personal" functions available by hovering over the current user's name at top left.
  - LON-CAPA logo (links to "About LON-CAPA" page)
  - Messages link to read or send messages to other LON-CAPA users
  - Roles/Courses link to switch to a different role or re-select the current role
  - Help link to access documentation
  - Logout link used to end a LON-CAPA session.

- **Drop-down list** Links ("About Me" page, User Preferences, Portfolio, Stored Links, Calendar, user's own RSS Feeds, and Search/Browse Library) which are included in the drop-down list available at top left.

- **Inline links** Links to course-specific functions: Contents, Grades, Chat, Classlist (if enabled), Groups (if available), Reservations (if available), Syllabus (if not explicitly included in course structure), course RSS feeds (if available).

6.10 External Tools

The domain coordinator for your domain can choose to enable definition and configuration of External Tools by course type, or for specific course(s). If tool definition is available in your course you will be able to use: Settings > Course Settings > Display ("External Tools" checked) to create new External Tool definitions for use in your course, or to modify existing ones.

Note: External Tools may also have been defined at a domain level for use in your course. If the tool you want to use is already available then you do not need to define your own, but can simply click"Upload" in the function categories listed at the right side of the Course Editor, below the editor tabs, and then click "External Tool". From there you'll choose " Defined in domain" and select the tool to add. If the tool you want to use is not available at a domain level, then after you have defined the tool (see below) clicking the "Defined in course" option will allow you to add an instance of that tool to the folder currently being edited. Tools added to the "Supplemental content" area will not store grades passed back from the Provider. If you wish to use that functionality you should add a tool instance to a folder or sub-folder in the "Main Content" area, and check "Yes" for Gradable.

By defining an External Tool in a course you enable use of LON-CAPA as an LTI Consumer (where LTI = Learning Tool Interoperability). Under the LTI protocol, the user's identity, as well as the course context, can be sent to the external tool (the Provider), which will trust the identity and role information provided by LON-CAPA (the Consumer). Any LON-CAPA data being provided are included in an encrypted form in the tool launch page sent to the user's web browser by LON-CAPA. The external tool will assign appropriate privileges to the user within the tool, based on the user's role.

The shared key and secret used to encrypt data sent to the Tool Provider are typically provided to you when contact the Provider to let them know you would like to use their tool with your Learning Management System, i.e., with LON-CAPA at your institution.

When you use Settings > Course Settings > Display ("External Tools" checked) a table will be displayed listing all currently available External Tools (i.e., LTI Providers) defined in the course, as well as an "Add" checkbox (for the last row in the table), used to add a new External Tool.

Internally in LON-CAPA each external tool you configure for your course receives a unique numerical ID (starting at 1), which remains unchanged, regardless of any future changes made to the configuration for that particular tool. A drop-down list in the left column of the External Tools table can be used to change the order in which available tools are listed in both the configuration table, and also in the dropdown list in the "External Tool" item in the Course Editor ("Upload" tab), when one or more tools are available.

Settings available in each External Tool definition are:

- **Required settings**

  The Provider name will be the Tool name shown in the listing of available External Tools in the Course Editor.

  For each External Tool the unique key and secret will be provided to you by the Tool Provider, as will the remote URL which will handle LTI launch requests from link(s) to instance(s) of the tool in LON-CAPA courses in your domain.

  Each External Tool can be configured to allow additional information to be appended to the Tool URL for each tool instance. There are four other required settings: Version, Message Type, Signature Method and Nonce lifetime. You will likely use the default values provided for each of the four.

- **Optional settings**

  There are five optional settings, for which you can set default values, which optionally you may allow to be overridden for each tool instance: Display target (iFrame, Tab, or Window), Width and Height (if target is Window), default link text, and default explanation.

  Optionally, you can also:

  - Set whether a tool can return grade information to the LON-CAPA course from which it was launched, for the user (and tool instance). You can also set the lifetime (in days) of the unique grade passback ID sent to the external tool, each time a user launches a particular instance of a tool in a course.
  - Set whether a tool can retrieve roster information for the LON-CAPA course from which it was launched, within a specified number of seconds from launch.
  - Upload a small image file, which will be used as an icon for the file type for each tool instance in the Course Editor.

- **User data sent on launch**

  For each External Tool, you will set what data are sent when it is launched. You can choose to send any or all of: Full Name, First Name, Last Name, E-mail address, Role (i.e., current "LTI" role, as determined from current role in LON-CAPA), and

User (either username or username:domain) for the user launching a tool instance in a course.

- **Role mapping**

  LTI uses a more restricted set of roles - Instructor, Content Developer, Teaching Assistant or Learner - than are available in LON-CAPA.

  For each tool you will set mapping to an LTI role to be used for each standard LON-CAPA role. At a minimum you should likely set that Course Coordinator (LON-CAPA) will map to Instructor (LTI), and Student (LON-CAPA) will map to Learner (LTI).

- **Configurable in course**

  The five optional settings: display target (and width and height, when target is window), default link text, and default explanation can be set to be configurable for each instance of a tool in a course.

  In addition, two other items sent on launch to the external tool - Course label and Course title - can be set to be configurable for each tool instance. If Course label is not configurable, the institutional course code for the LON-CAPA course will be used, whereas if Course title is not configurable, the LON-CAPA course title will be used, respectively, for context_label and context_title, as part of the data sent to the external tool on launch.

  Lastly, the Provider URL can be set to be configurable, so that text, such as a path or query string, will be appended to the default Provider URL to which the encrypted LTI data are sent on launch can. The text appended can potentially be unique for each tool instance.

- **Custom items sent on launch**

  Besides the set of standard LTI items, you may also add name=value pairs to send additional data to the LTI Provider on launch of the tool in a LON-CAPA course.

  LON-CAPA will automatically prepend *custom_* to the name of each custom item you set in the tool configuration when preparing the data to send to the external tool.

  If the entry in the *value* textbox is of the form: LONCAPA::env{lcenvkey}, where *lcenvkey* is the name of an item in LON-CAPA's own %env hash, then the LON-CAPA::env{lcenvkey} value in the custom_name=value pair sent on launch will be the value of $env{lcenvkey} in effect in the user's LON-CAPA session. Otherwise, whatever value is set in the domain configuration for the tool for item *name* will be sent as the pair: custom_name=value.

For reference the complete set of parameters (other than custom_*) which could be present in the data POSTed on LTI launch (depending on how the tool is configured) is as follows:

```
basiclti_submit
context_id
```

```
context_label
context_title
context_type
ext_ims_lis_basic_outcome_url
ext_ims_lis_memberships_url
ext_ims_lis_memberships_id
launch_presentation_document_target
launch_presentation_locale
launch_presentation_height
launch_presentation_width
lis_outcome_service_url
lis_person_contact_email_primary
lis_person_name_family
lis_person_name_full
lis_person_name_given
lis_person_sourcedid
lis_result_sourcedid
lti_message_type
lti_version
oauth_consumer_key
oauth_nonce
oauth_signature
oauth_signature_method
oauth_timestamp
oauth_version
resource_link_id
resource_link_title
roles
tool_consumer_info_product_family_code
tool_consumer_info_version
tool_consumer_instance_description
tool_consumer_instance_guid
tool_consumer_instance_name
tool_consumer_instance_url
user_id
```

6.11 Link Protection

The Link protection panel is used to manage Learning Tool Interoperability (LTI) credentials used when the availability of specific resource(s) or folder(s) in a LON-CAPA course needs to be restricted to deep-link-only access, via launch from another learning system. A use case would be where another learning system supports an online proctoring environment which students must use when accessing an exam folder in a LON-CAPA course.

Although configuration primarily uses the deeplink parameter available via the Param-

eter Manager for a specific resource or enclosing map/folder, the options available when setting a value for that parameter can include the ID of an LTI launcher created using the course settings configuration menu reached via: Settings > Course Settings > Display ("Link protection" checked).

LTI launchers created in a course will be numbered incrementally (starting at 1), and each one will be listed in a drop-down list shown in the "Link protection" box for the deeplink parameter itself, available when editing the deeplink parameter, if the currently checked radio button is: "course LTI launch".

For each LTI launcher configured in a LON-CAPA course, the following need to be specified:

- Launcher Name
- LTI Version
- Nonce lifetime (s)
- Key
- Secret

The **Launcher Name** is used to identify an option shown in the "course LTI launch" drop-down list when setting a value for the deeplink parameter in the Parameter Manager. Its value can be changed without impacting the behavior of the link, as LON-CAPA internally stores the launcher item associated with a deep-link using the unique numeric identifier assigned to the launcher item when it was first created.

The **LTI Version** will be 1.1. It is expected that newer versions will also be supported in the future.

A short **Nonce lifetime** can inhibit use of replay methods to circumvent link protection provided by LTI. There should not be a need to set the value to other than the default of 300s.

The **Key** and **Secret** should be kept secure, and will be needed when configuring the "External Tool" item in the other system which is linking to LON-CAPA. There may be restrictions in place in the domain which specify a minimum or maximum length for a Secret, and also rules for its composition in terms of upper case, lower case, numbers, and/or special characters. If requirements are not met, an alert will be displayed indicating what is needed when "Save Changes" is pushed. Once a Secret has been saved for a particular launcher, LON-CAPA will not display it again, so it is recommended to make a note of it, so it can be used in the other system. To change an existing Secret check the "Yes" for "Change?" to make a textbox available for entering the new Secret. Note: the Key and Secret can only be submitted from a session on the course's home server, so if your session is on a different LON-CAPA server, a link to switch server will be shown in place of the textboxes for those two items.

A domain coordinator may have also configured LTI launchers for use in deep-linking, and if so, those will be available from a separate drop-down list displayed when setting the deeplink parameter when the currently checked radio button is: "domain LTI launch".

The sole difference between the LTI launchers for deep-linking defined in a domain and those defined in a course is that for the former, a Course Coordinator must obtain the key and secret from a Domain Coordinator, whereas for the latter a Course Coordinator will set the key and secret. Note: the key and secret will be needed when configuring the LTI launch (in the other system) which is deep-linking to a specific folder or resource in the LON-CAPA course. Although the details of the configuration on the launcher side will be specific to the particular system, the general approach is that an "External Tool" will be added in a course container on the other system, with an endpoint URL specified, along with the key and secret used to encrypt the payload sent with the request to the LON-CAPA endpoint URL.

If the domain has been configured to allow a username to be accepted from the signed payload, then for each LTI launcher there will also be a Yes/No option: **Use identity?**. If 'Yes' is selected then two (optional) settings can be specified:

- Source of username in LTI request
- Action if username does not match enrolled student

Deciding what to select as the source of the username requires knowing what the other learning system sends in the LTI Request. Ideally, the other system will provide a preview feature for instructors to use to display items included in a launch request, and values set for them (for the previewer). In LON-CAPA, selecting "User ID" for the username source indicates the username will be whatever was assigned to the "lis_person_sourcedid" parameter, whereas selecting "Email address" means the username will be whatever was assigned to the "lis_person_contact_email_primary" parameter by the launch system. If neither of those are appropriate then "Other" can be selected, and the appropriate parameter name in the LTI Request can be entered in the textbox.

A username will only be accepted from the launch data for session creation in LON-CAPA if the corresponding user has already been assigned a student role, and no privileged role(s) in the target course in LON-CAPA. What will happen if that condition is not met can either be to stop the launch, or to display the LON-CAPA login page, and allow a user to authenticate. The second of those is the same behavior as seen if "No" had originally been selected for "Use identity?'.

Unlike LON-CAPA, other learning systems do not typically support multiple domains. As a result when creating a user session based on a username included in the launch payload, the implicit assumption is made that the user's domain in LON-CAPA is the same as the course's domain.

In the case where usernames are not accepted from the launch payload, then each user will need to authenticate using the standard LON-CAPA username and password after the signed payload has been verified. After authentication the user's LON-CAPA session will still be recorded as having been launched from the deep-link target URL, as long as the access control setting for the deeplink parameter for the corresponding resource, or enclosing map/folder, is configured to support launch from the external system which provided the signed payload.

The endpoint LON-CAPA URL specified in the "External Tool" item in the other system will be composed of the following components: protocol or scheme (i.e., http or https),

://, hostname, /adm/launch, and the "tiny URL' path to the target resource or folder. If the LON-CAPA domain expects all access via a single server (i.e., a LON-CAPA load-balancer/portal node), then the hostname used should be the one assigned to the load-balancer.

As the key and secret used for launch items (either in a course or a domain) will be unavailable to LON-CAPA nodes belonging to a different LON-CAPA domain, if LTI link protection is to be used for deep-linked items, it is requirement that the endpoint URL include the hostname of a LON-CAPA server in the course's domain.

Following the hostname, the remainder of the URL will have the format:

```
/adm/launch/tiny/$domain/uniqueID
```

where /tiny/$domain/uniqueID is a shortened URL, unique to the particular folder or resource in the specific course.

Course Coordinators can generate shortened URLs for items in a course by using: Course Editor > Content Utilities > "Display/Set Shortened URLs for Deep-linking"; see: Short URLs section 8.3

6.12 Spreadsheets

This panel lets you set default sheets for the three levels of the spreadsheet (Course, Student and Assessment) and also whether empty rows show be hidden when displaying the spreadsheet (default is "no").

See the "Introduction to the Spreadsheet" section (18.1) for more information about the spreadsheet.

Setting spreadsheet options is only relevant if the "Grading" is set to "Spreadsheet."

6.13 Bridge Tasks

Bridge Tasks (BTs) are open-ended, performance-based assessments. See the "Introduction to Bridge Task" section in the Authoring manual for more information.

If you use Bridge Tasks in a course, this panel provides the ability to set the following options for all BTs.

- Send message to student when clicking Done on Tasks (default is "no").
- Bridge Task grading by instructors and TAs in sections (default is to grade BTs in any section
- Hide upload references prompt if uploading file to portfolio (default is "no")

6.14 Other Settings

This panel lets you set the course/community environment variable: "reshome", which will have been set to /res/coursedomain (where coursedomain is the course's domain) when the course was first created.

The variable "reshome" determines where the Home link points to when a Course Coordinator displays the virtual filesystem used to browse or import content from the shared content pool.

This panel also lets you create your own course environment variables, which, for example, could be accessed when rendering a homework problem by accessing the variable via `&EXT("course.myvariablename")`, where "myvariablename" is the name assigned in the "Create New Environment Variable" textbox. In course context the value set in the textbox in the "Value" column would be retrieved by the &EXT() call. See the "Table: LON-CAPA Functions" section in the Authoring manual for more information about &EXT().

7 Editing Course Content

A LON-CAPA course is managed through the **Course Editor** screen which can be accessed in a number of ways.

- Selecting **Course Editor** in the Inline Menu
- Selecting **Edit course contents** from the Main Menu.
- Clicking the icon in the Tools at the top of the Course Contents screen.
- Clicking to the right of a folder name on the Course Contents screen. (Editor will open that specific folder).
- Clicking in the Functions menu when viewing content in the course. (Editor will open that specific folder).

The Course Editor screen allows you to create new resources, upload resources or import LON-CAPA resources from the LON-CAPA network. The screen also allows resources to be rearranged within the course.

The Course Editor contains three tabs:

1. Main Content Editor
2. Supplemental Content Editor
3. Content Utilities

Main Content Editor tab is used to manage the primary content of the course. Content within this area can:

- Have parameters set (including dates controlling availability)
- Can be incorporated in PDFs for printing, created by LON-CAPA's print utility
- Can be a part of sub-folders for which different students may see a subset of contents picked from a pool, and/or contents displayed in a different order.

- Be organized within a hierarchical arrangement of folders and sub folders.
- Can originate in a variety of ways including import from the shared content pool.

Within the course, students use the navigation controls to move through the Main Content. **Main Content** is listed on the **Contents** screen. Main Content was added to LON-CAPA in 2003 (version 1.0), so pre-2003 courses (as well as courses deliberately created in the old style) will not have Main Content. The Main Content was called Main Course Documents in versions 1.0 through 2.10.

Supplemental Content Editor tab is used to manage supplemental content in the course. Content within this area is restricted to uploaded files, a syllabus page, a web page created using the HTML editor, or a web page on an external server retrived from a remote site, but displayed within the LON-CAPA interface. A hierarchical arrangement of folders and sub folders can be created. Students access supplemental content documents by selecting the **Supplemental Content** tab while viewing the **Course Content**. Supplemental Content is particularly useful for auxiliary files that may not be directly viewable or usable in a browser, such as PowerPoint presentations or Word documents – some of which may require a viewer to be installed on a student's computer.

NOTE: Although the Course Editor provides instructors with the ability to import content from the shared content pool, or to copy content from other courses, as well as personalize courses with their own syllabi or information pages, for the ultimate power in creating reusable content, you will want to become a content **Author**. This is especially true if you plan to create your own assignments. The "simple problem" templates available to create assessment items directly with a course, provide a much restricted set of components compared to those available when constructing assessment items as an author.

Policies and methods for creation of **Author** roles vary depending on user status and domain. If you are a course instructor, and you do not have an authoring role, and you do not see a "Request author role" link on your Roles page, make a request through the "Ask Helpdesk" link available on the "Help" page. For more information about content authoring in LON-CAPA, see the LON-CAPA Author's Manual available online at `http://help.lon-capa.org` .

7.1 Main Course Content

The Main Content area will contain the "top-level" documents in your course. Users enter the course at the first resource listed in the Main Content. As they proceed through the course, they proceed towards the last resource. Main Content items also appear on the **Course Contents** screen.

Main Content items can have contents setting applied to them which control such things as availability, visibility, and support for attached discussion boards which are unavailable for items in the Supplemental Content area. A hierarchy of folders can be used to organize the Main Content area.

In addition, the Main Content area can include a **Course Contents** page, **Simple Pages**, **Discussion Boards**, or Assessment items imported from the shared content pool.

NOTE: Any changes made to the Main Content will be visible upon re-initializing course, or at the next log in.

7.2 Adding Content to Your Course

To add course content, either select **Course Editor** on the Inline Menu or select **Edit course contents** on the Main Menu.

There are several ways you can add a new resource to the course:

- Organize documents into folders for structure (see section 7.3)
- Link or **Upload** a document from outside LON-CAPA, for instance by creating a link (see section 7.4.1) or by uploading a document from your hard drive such as a PowerPoint presentation or a PDF file (see section 7.4.4)
- **Import** a Published Resource from the LON-CAPA network (see section 7.5.2)
- Configure **Grading** resources such as Simple Problems, Drop Boxes, and External Scores.
- Configure **Collaboration** tools such as Discussion Boards, Course Rosters, and Group Portfolios.
- Create **Other** items, e.g., from a prepared template (see section 7.8) For example, this category includes a **Table of Contents**, which creates a resource in the course that displays the list of course contents. Because the first resource opens for students when they login, using a Table of Contents as the first resource may be a good idea. This category also includes **Blank Web Pages.**

To change the order of the resources, click on the blue up or down arrows next to the resource you wish to move. Repeat this until you have all the resources in the order you want them. Other options include: Remove or Rename.

Menu tabs have changed between version 2.10 and 2.11. The equivalent commands are:

2.10 Menu	**2.11 Menu**
New Folder	New Folder
Import Content	Upload
Published Content	Import
	Grading
Special Documents	Collaboration
	Other

NOTE: Changes made to Main Content are visible upon next log in, or by re-initializing course. Displaying the Contents page in a course will also re-initialize the course behind the scenes, unless it has been less than 10 minutes since the last check was made to see if the course had been changed.

7.3 Adding Folders

You can add folders to your **Course Contents** screen to organize your course. Folders can act as sequences, chapters, modules, or homework sets. To add folders to your course, do the following:

1. Log in to the course you wish to add folders to.

2. Select **Course Editor** on the Inline Menu or **Edit course contents** within Main Menu.

3. At the **Course Editor** screen, click on New Folder on the in-line menu.

4. Type the name of the new folder in the pop-up window and click OK.

   The folder appears at the bottom of the course document area you added it to.

5. To add resources to the folder, click on the folder you created. A new **Course Editor** screen opens. Note that under the **Main Content** and the **Supplemental Content** tabs, there is a directory path starting with **Main Content** ≫ and ending with the name of the currently selected folder. A newly created folder is initially empty. Add resources to the folder exactly as they are added in the "top-level" Main Course Content areas (7.2).

NOTE: New folders are visible by re-initializing course or next time you log in.

7.4 Upload or Link Content

7.4.1 External Resource

Web Pages housed on a web server external to the LON-CAPA content network can be displayed in a LON-CAPA course, within the standard interface, (i.e., inline menu including navigation controls, and links/icons), by adding an External Resource to the course.

If the external server has been configured to disallow display of the content within another page, LON-CAPA will simply display a link to the external web page instead of showing the page's content immediately below the standard LON-CAPA interface elements.

1. Select **Course Editor** on the Inline Menu or **Edit course contents** within Main Menu.

2. On the in-line menu of the **Course Editor** screen, click Upload. Next click on **External Resource**.

3. Type in the title of the web resource you wish to add in the **Title** text box.

4. Type in the URL of the web resource in the **URL** text box.

5. Click the Preview button to display the external web page in a pop-up window.

6. Click the Add Link button to add the web resource to the course.

NOTE: Your new resources will be visible the next time you log in, or by re-initializing course.

7.4.2 External Tool

A domain coordinator determines whether External Tools which support the LTI (Learning Tool Interoperability) standard should be available in each course type, or in specific course(s), and also whether definition and configuration of such tools are permitted within your course.

External Tools may have been defined at a domain level for use in your course, and if so, the options which can be set when including one of the available tools within a course or community, will also have been set in the domain.

The full range of options which may be available to the Coordinator in the course or community are:

- Display target
  - iframe – the tool will be launched within the standard interface, (i.e., inline menu including navigation controls, and links/icons)
  - tab – a page containing a link to launch the tool will be displayed in a separate web browser tab.
  - window – a page containing a link to launch the tool will be displayed in a separate web browser window.
- Display options – if display is tab or window, additional options may be available:
  - Link Text – the text used in the link which launches the tool
  - Explanation – optional text block (HTML mark-up can be used) displayed below the link
  - Width/Height – if display is window, width and height of the new window can be set by specifying the number of pixels to use for each.
- Course label – e.g., institutional course code (sent on launch of tool)
- Course title – Course Title
- Append to URL – you can specify text to append to the default URL (shown) which will be requested on launch.
- Gradable – if a tool is used in Main Content, you can choose whether to accept scores passed back by the tool, if the domain configuration specified availability of a passback service.
- Title – title to use for tool instance on the Course Contents page.

If External Tools can be used in the course's domain, you will choose either "Defined in domain" or "Defined in course" to populate the "Select" drop-down list with a list of available tools. Choose the name of the tool you wish to use from the drop-down list. Doing so will cause the options for the tool to be displayed. If display is in an iframe, by default,

but you are permitted to choose one of the other types, then click tab or window will cause additional elements to be displayed.

For tools defined in the domain, your domain coordinator can tell you what data are sent to the external tool when it is displayed. Typically, though, this will include the username of the user, as well as the user's current "LTI" role. For tools defined in the course, you can see what data are sent ny using Settings > Course Settings > Display ("External Tools" checked).

LTI uses a more restricted set of roles – Instructor, Content Developer, Teaching Assistant or Learner – than are available in LON-CAPA. For tools defined in the domain, your domain coordinator will have decided on the mapping to an LTI role to be used for each standard LON-CAPA role. At a minimum you can expect that Course Coordinator (LON-CAPA) will map to Instructor (LTI), Student (LON-CAPA) will map to Learner (LTI).

Under the LTI protocol, the user's identity, as well as the course context, will be sent to the external tool in an encrypted form, and the tool (the LTI Provider) will trust the user's identity and role sent from LON-CAPA (the LTI Consumer), and then assign appropriate privileges to the user within the tool.

7.4.3 IMS Import

An **IMS package** is a file containing course content from another Course Management System (e.g., Blackboard or ANGEL) packaged according to the IMS 1.1 specification. The original IMS package file can be removed from your authoring space later, once the package has been decompressed and the files converted to LON-CAPA sequence, page, problem, or discussion board files, or stored as html, image or movie files etc., as appropriate.

7.4.4 Uploading a New Main Content File

Any file you create on your hard drive can be uploaded into your course (e.g., PowerPoint presentations or PDF files).

To upload a file from your hard drive into the course, do the following:

1. Create the document and save it to your hard drive.
2. Log in to the course to which you wish to add content.
3. Select **Course Editor** on the Inline Menu or **Edit course contents** within Main Menu.
4. Click on Upload on the menu bar of the **Course Editor** screen.
5. Type in the path to your document or click the Browse... button to find the the document on your hard drive. You can upload a single file (e.g., pdf, ppt etc.) or an archive file (zip and tar files are acceptable) from which multiple files can be extracted.
6. Type the document title in the Title text box.
7. Click the Import Content button.

Special Notes on importing **Web Pages**: If you have already created a web page outside LON-CAPA you can upload the images when you first upload the web page, in one of two ways. Either:

(a) upload the web page via: Course Editor -> Upload -> Upload File, and check the **Upload embedded images/multimedia files if HTML file** checkbox. You will them be prompted to upload the image files (as dependencies)

or

(b) Create a zip (or tar) file archive containing the web page and the images (e.g., in a sub-folder). Use:

Course Editor -> Upload -> Upload File

to upload the zip file. LON-CAPA will prompt you to decide what should be done with the content.

In general, there is no need for image/multimedia files to be loaded into the course content hierarchy if the images are linked from a Web Page. Instead, upload the web page(s) that contain the images, and then upload the images as dependencies. One limitation of this method currently, is that if you use the same linked content in many places, those file cannot be shared and must be duplicated for each page. If you upload a Web Page and forget to check to box to include embedded images/multimedia files, you can still upload the individually. See the section 7.8.5 for more information about working with Web Page file dependencies.

NOTE: Your new file will be visible the next time you log in, or by re-initializing course.

7.5 Import Published Content

7.5.1 Inserting Published Content by Searching

Click on Import above the course contents on the **Course Editor** screen. Next click on **Search** to search the LON-CAPA resource pool and select published resources to add to your course. See also the sections on Basic Searching (25.6.1) and Advanced Searching (25.6.2).

7.5.2 Inserting Published Content by Browsing

Any resource from the LON-CAPA network that you have permission to use can be imported into your course documents, provided you are the Course Coordinator. All resources from the LON-CAPA network can also be imported.

1. The **Browse** tool is intended for use when you know the folder location of the resource, click on **Import**. The **Browse Published Resources** screen will open with a view of the LON-CAPA network. Navigate to find the desired resource. For more guidance on Browsing, see the section 25.7.

2. Check the boxes next to the resources you wish to import.

3. Click the Import button at the top of the screen.

4. When selecting more than one document, you can re-arrange the order. Prior to insertion into the course document sequence, click the Continue Import button to collect more resources, or to cancel the process. Click the Finish Import button to add the resources to your course documents.

If you are importing a **Web Page**, it is important to understand that image/linked files do not need to be specifically imported into a course, if used within a published file which is already imported into a course. The metadata for the imported web page includes the dependencies, and import of the web page into the course automatically allows students enrolled in the course access to view the images as well as the web page which contains them.

NOTE: Your new resources will be visible the next time you log in, or by re-initializing course.

7.5.3 Inserting Published Content from Stored Links

Your personal library of Stored Links can be a powerful method to save links to your favorite resources so that they can be quickly inserted into a course. Navigation within your Stored Links is intuitive. Use the checkboxes to select resources to import. For information on creating a library of Stored Links, see see section 4.8.

7.5.4 Imported Documents: Load Map

You can load all the resources from an existing LON-CAPA sequence into the current folder displayed in the **Course Editor** area. This allows you to easily fill a folder with existing resources, and subsequently manipulate the folder, such as by deleting or reordering the resources.

Note: If you have no intention of changing the order, it's easier to load the sequence directly using the Import link after selecting the **Import** tab.

Load a map's resources into the current folder as follows:

- Select the **Import** tab in the Course Editor inline menu, and click on the **Import from Assembled Map** link to display the interface used to specify a map to load.
- Click the Select Map link to open a window displaying the virtualfile system for the shared content repository.
- Navigate to the desired sequence, and click the **Select** button next to it.
- Click the Load Map button.
- The map will be loaded into the current folder.
- re-initialize course to make changes active for the current session.

7.6 Grading Resources

7.6.1 Simple Problem

To add a **Simple Problem** to your course documents, do the following:

1. Select **Course Editor** on the Inline Menu or **Edit course contents** within Main Menu.
2. On the in-line menu of the **Course Editor** screen, click Grading. Next click on **Simple Problem**.
3. In the pop up window, type the name of the new page and click OK.

   The page will appear at the bottom of the course document area to which you added it.
4. Click the re-initializing course button.
5. Click on the problem link in the **Document** column to open the problem.
6. Click the Edit link to edit your problem. Choose one of the question types from the drop-down menu and then click the Save and Edit button.
7. Edit the problem and click the Save and Edit button to view your changes.

The possible problem types are: 1 of N multiple choice; Option Response; Essay; Short String Response, Numerical Response.

- **1 out of N Multiple Choice**

  This is a question where students can choose only one correct answer from a selection. Each choice in the selection is called a "foil" because the majority of the selection choices try to foil the student. Only one foil is correct.

  LON-CAPA randomly displays the foils to students. If you choose to set the max number of displayed foils to 4, but only have 6 foils, then LON-CAPA will choose one of the True foils and fill in the rest of the foils with false foils, up to a maximum of four foils. To edit the 1 out of N multiple choice problem, enter your question text into the appropriate box. Then enter one foil statement into each foil box you want to use. You do not have to use all 10 of the foil boxes. For each foil you do use, you need to assign it a value of True or False.

  You can choose to assign a foil a location. For example, the foils appear in random order to your students. If you have a foil statement of "None of the above", then you want this statement to always appear at the bottom.

  After entering all of the correct foil text, you can add an optional hint. The hint text appears under the student's view of the problem after getting one incorrect submission. The hint text remains displayed on your students' views of the problem after it is correct, for study purposes.

At any point in the editing process, you can choose to store your changes. Each time you click Save and Edit , the current view of the problem will appear in box at the top of the edit screen. When finished editing, click the Save and Edit button and then the the Student view link in the **Functions** section of the Inline Menu.

- **Option Response**

  The Option Response question type is a matching question. Instead of students selecting one true foil from a list, each foil has a drop-down box in front of it where students have to select the correct option for each statement.

  The editing of this problem type is very similar to editing the 1 out of N multiple choice problem. Enter your question text into the appropriate location. In the Add a New Option text, add one of the drop-down box options and then click the Save and Edit button. Repeat adding options until you have added all you want. If you make a mistake, select an option to delete and then click Save and Edit. After adding all of your options, type in the text for each foil and assign each option the correct value and location. You can add an

  When finished editing, click the Save and Edit button and then the the Student view link in the **Functions** section of the Inline Menu.

- **Essay**

  Enter your question text into the appropriate location and click the Save and Edit button when you are done. Students will see your question and with a text block in which to enter in their short answer essay. Using the parameters, choose whether students submit their essays in groups or individually, and choose to allow students the ability to upload files, such as a Word document.

- **Short String Response**

  This question type gives students a small text box where they can enter their answer in the form of any string; most appropriately a word, but a number or short phrase will work as well. You choose whether string responses are case senstive or not.

- **Numerical Response**

  The Numerical Response question type requires students to enter a number as their answer.

  Enter the question you wish to ask in the "Question Text" text area.

  Editing of this problem type requires the specification of an answer in the "Correct answer" text box.

  If you wish to use units, enter a supported unit in the "Units" text box. Unless the required answer will be a pure integer you should include a tolerance in the "Tolerance" text box. Tolerances can be set to be relative (by ending the entry in the tolerance textbox with a %), or absolute. If you wish to restrict the number of significant disgits which may be entered, replace the default (1,15) with either a single digit, or two comma separated digits (min and max number of signficant digits required). The

format text box controls the formatting used when the 'correct' answer is displayed to a student.

The answer which students need to enter for a Numerical Response question type can be determined dynamically at the time the question is rendered for each student. Consequently, it is possible for different students to receive different versions of the problem, if you define some variables in the "Scripting (optional)" text area. Those variables can also be included in the Question Text itself (in which case the variable will be replaced with current viewer's value). Equally the answer which is expected can also be a variable. The programming language used in the scripting block is **Perl**. In perl, variable names are prefaced with $ and set equal to a value, or more commonly to the value of some function with the assignment operator: =

LON-CAPA provides a number of functions, including &random() which will generate a random number for each student. The randomization is repeatable for each student each time he/she displays a particular instance of the Numerical Response problem in a course, but generally will be not be the same for two students (the student's username is included as one part of the seed used in the randomization). See the "Calling Functions" section in the Authoring Manual.

For more information about available script functions in LON-CAPA see the LON-CAPA Functions section in the Authoring manual.

When finished editing, click the [Save and Edit] button and then the **Exit editing** link in the **Functions** section of the Inline Menu.

7.6.2 Drop Box

A dropbox is used for students to upload files for grading.

There are two ways for students to add a file to a dropbox.

- Click Select Portfolio Files to open a pop-up window, which will display the student's portfolio. The student selects which file(s) to submit using the checkbox(es) and presses the [Selected checked files and close window]
- Click the [Browse] to upload a file from the student's computer.

In both cases, the [Submit Answer] button needs to be pressed to complete the submission.

What happens in the case of a directly uploaded file is that the file will be saved in a "turned_in" directory in the student's portfolio. In all cases, by associating file(s) with this dropbox, the file status in the portfolio changes to "locked" such that it can not be modified by the student, until the instructor has graded it, or the student deletes its association with the dropbox.

The "Currently submitted files" area contains a listing of files currently submitted via the dropbox. A student can check the Delete checkbox, and then [Submit Answer] to remove them from the dropbox. Note: the files themselves remain in the student's portfolio, and are not deleted.

A student can continue to upload files until the due date for the dropbox is reached, or (if before the due date) until the submissions have been graded, and full credit received. An existing submitted file can be overwritten with a file of the same name.

If a student chooses the radio button: "Save entries below (not submitted for credit yet)", then the student will not be listed as having submissions in the grading screen, and the count for number ungraded in the What's New screen (Problems requiring handgrading) will not include this student.

The student needs to return to the dropbox before the due date and check the radio button: "Submit entries below as answer to receive credit", making sure that the file(s) to be graded are listed in the "Currently submitted files" area. The student will complete the submission by pressing Submit Answer

7.6.3 External Scores

An **External Scores** item provides an upload or manual entry for scores. For example, manually graded homework, manually graded exams, or clicker scores can be uploaded using the External Scores content. Create an External Score item for each assignment that you will upload. You can insert a Score Upload Form into your course, and use it to enter student's scores for an exam, project, or any other assignment.

To create a Score Upload Form, do the following:

1. Log in to the course you wish to add a Score Upload Form to.
2. Select **Course Editor** on the Inline Menu or **Edit course contents** within the Main Menu.
3. At the top of the **Course Editor** listing, click **Grading**. Next click on **External Scores**.
4. In the pop up window, type the name of the new page and click OK.

To upload scores:

1. Navigate to the External Scores content. Select the 'Content Settings' item in the Functions menu.
2. In the column titled 'For Resource', set the problem weight.
3. Return to the problem and choose the inline menu item: 'Content grades'.
4. Choose the option to upload scores.
5. Browse your computer to find the file with your students' scores. The file can be a CSV file, a text file with values separated by a semicolon, or a tabulator separated file. The file can contain unnecessary data. However, it must contain one column that is either the username or student ID number and another column that is either the number of points or the partial credit factor (for example, .8 for 80 percent). If your students are

in multiple LON-CAPA domains, then you must include a domain column. Optionally, you can include a column for problem status (for example, to excuse the problem or reset the problem status) and a column to define the number of attempts (tries).

6. Click the button to upload scores.
7. For each mandatory and optional column, match it to the appropriate field. Columns that contain unnecessary data for LON-CAPA can be left alone.
8. Click the button to 'Assign Grades.'

7.7 Collaborative Tools

7.7.1 Discussion Board

Discussion Board allows you to add a dedicated Discussion Board page to the course. By default, *all* pages can host discussion, but you may wish to centralize the discussion, or provide a place for general course-related discussion.

7.7.2 My Personal Information Page

Inserts your **Personal Information Page**

7.7.3 Personal Information Page for a User

Inserts the **Personal Information Page** for another user, typically another instructor or TA.

7.7.4 Course Roster

Inserts a course roster.

A student-viewable course roster can be enabled in two ways:

- Including a Course Roster item within the Course Contents using the Course Editor. If you add a student-viewable course roster using the Course Editor you must also use "Edit" to set whether students enrolled in your course are listed by default.
- Using the **Classlists and staff listing** item in Course Settings to set student-viewable classlist options which include a viewable classlist.

For the first method proceed as follows:

1. Select the **Course Editor** from the online menu.
2. Select the **Collaboration** tab.
3. Select the "Course Roster" item.

4. Click the 'Edit' link, and set 'Student-viewable roster settings' One of: 'Classlist of all sections' or Classlist of viewer's section needs to be selected for the classlist to be accessible to students.
5. Click 'Save'
6. Click 'Exit Editing'

For the second method proceed as follows:

1. Select **Course Settings** from the **Settings** dropdown in the inline menu.
2. Check the checkbox for **Classlists and staff listing** and click 'Display'
3. Make appropriate selections in the Student-viewable classlist options area
4. Click 'Save'

Note: the information displayed in the student-viewable roster is as follows:

- Last Name, First Name (links to user's Personal Information page)
- Username:domain (links to Message creation page to send message to this student)
- Section
- Available Portfolio files (if the link to accessible portfolio files is enabled)

You can choose whether student's individually need to opt-in to be displayed in the student-viewable roster.

When display of a student-viewable roster is enabled in a course, a student's inline menu will include a **People** item. If display is not enabled that item will be absent.

7.7.5 Group Portfolio

Group Portfolio adds a page with information about files located in file repositories within course groups. Which files are listed as viewable will depend on the types of access controls set for individual files, and the identity of the person viewing the Group Portfolio page.

7.8 Other Content

Several templates are available for you to fill out and add to your course.

To add a templated document to your course, click on **Other** Inline Menu of the **Course Editor** screen. Items include

- **Composite Page**
- **Syllabus**

- **Table of Contents**
- **Simple Course Page**
- **Blank Web Page**

7.8.1 New Composite Page

Add composite pages to your **Course Contents** to combine separate content items together for display in a single web page. Composite pages can contain uploaded files, homework problems imported from the resource repository, and/or simple problems created using the problem editor. To add a composite page to your course, do the following:

- Log in to the course to which you wish to add a page.
- Select **Course Editor** on the in-line Menu or **Edit course contents** within Main Menu.
- On the in-line menu of the **Course Editor** screen, click Other. Next click on **New Composite Page**.
- In the pop up window, type the name of the new page and click OK.

  The page will appear at the bottom of the Main Content folder to which you added it.
- To add resources to the page, click on the name of the page you created.

The Course Editor screen will refresh, and the updated display will include the name of the new page appended to the end of the breadcrumb trail, that extends below the **Main Content** tab. The page is currently empty. Add new resources to the page as you would add resources to a Folder or to the "top-level" Main Content area (7.2), except that only a subset of the items in the "Other" tab that may be placed in a folder, are available for placing in a composite page. Also, if you use "Import" to include a published sequence in a page; then when the page is displayed; the sequence will open and all of its contents appear as elements of the composite page (i.e., no "folder" will appear in the page). If you wish to be able to hide selected elements from the sequence, you should use "Select Map" and "Load Map" to unpack the sequence prior to import.

Note: Your new composite page will be active the next time you log in, or by re-initializing course.

7.8.2 Syllabus

Syllabus adds a syllabus to your course. By default this will be a traditional syllabus template page, which can be filled out with standard syllabus information. To create a syllabus using the syllabus template, do the following:

1. Select **Course Editor** on the Inline Menu or **Edit course contents** within the Main Menu

2. At the **Course Editor** screen within the **Main Content Editor** tab, click Other on the menu bar above the course contents. Next click on **Syllabus** to insert a syllabus template.

3. Click the re-initializing course button to make changes active for the current session.

   NOTE: The file will appear in the main course document list, where the user can move, rename, or remove it. If the user does not click re-initialize course the changes will become active the next time the user logs in. When you first add a syllabus to a course using the Course Editor you will need to click that button in order to be able to edit it.

4. Click the Edit link in the **Actions** column.

5. By default the standard syllabus template is selected. Check checkboxes for any items in the 'Choose template items ...' box which you wish to edit. For one checked a box containing a text area for editing will be displayed.

   For more information about using LON-CAPA's templated text entry system, please see the Editing Template Files section (5.4).

6. Click the **Save** button to save your changes.

NOTE 1: To see the student view, click the **Exit Editing** link in the Functions menu just below the top of the screen.

NOTE 2: If your syllabus is already anywhere on the web (in or outside of LON-CAPA), you can either:

- replace use of the standard templated syllabus with the syllabus available from there, by selecting 'External URL' as the Syllabus Type, and enter the URL in the External URL textbox, then press Save, or

- Specify the URL for inclusion in the bottom field of the Standard syllabus template.

In general, resources inside of LON-CAPA are only accessible when logged into the system. A syllabus, however, can be accessed without logging in, since students want to be able to access a course syllabus before enrollment. Copy and paste the link provided for external access to this document.

Note: if your Domain Coordinator has enabled display of the Course/Community Catalog link, on the log-in page, and your course has been assigned to a category in the Catalog, then students will be able to display a listing of courses which will include your course along with a link to the Syllabus page.

7.8.3 Table of Contents

Table of Contents inserts into your course the exact same page as it is accessed by clicking on **Contents** in the Inline Menu or by selecting **Table of course contents** on the Main Menu. The Contents screen includes three tabs – "Main Content", "Supplemental Content" and "Content Search". By default, the Main Content tab is selected, and folders and resources in the top level of the Main Content area will be displayed. After an item has been selected from this screen, users can use the navigation controls to move from one item to the next. Putting a **Course Contents** page as the *first* resource in your course ensures that the Course Comtent screen will be the first page students see; some instructors find this to be advantageous.

7.8.4 Simple Page

Simple Page allows you to add a simple HTML page to the course with an area for text and an area to add web references. Give the page a **Title**, type plain text into the **Content** textbox, and add any links to other resources in the **Web References** section, where they will be turned into HTML links for the students. Simple Pages allow you to upload a graphic into them. On the editing screen, either type the path to the photo, or click the Browse... button to select the file to upload, and then click the Upload button.

7.8.5 Blank Web Page

Although web pages used in a course may always be uploaded to Authoring Space, published, and then imported into a course (and that certainly would be the favored approach for web page content that is suitable for re-use in multiple contexts), there may be content which is better suited to upload directly to a single course.

For example, some content may logically really only belong in a single course. It may also be the case that some users may be granted privileges to edit course content, but not have an author or co-author role, which would allow them to publish content.

There are four ways to upload a web page (and any embedded dependencies, e.g., images etc.) directly to a course:

- Upload an existing HTML file, see: 7.4.4
- Upload an existing zip file containing a web page and any dependencies, see: 7.4.4
- Add a blank Web Page
- Add a Simple Course Page, as explained in the section 7.8.4

For the first three of these, the web page may contain multiple dependencies, e.g., images, applets, movies etc. By contrast, only one optional image file dependency is supported for the template-based "Simple Web Page",

When working with web pages uploaded directly to a course, you will find that the procedure for adding images and other embedded objects to a web page is different to

that encountered when managing web pages in Authoring Space. LON-CAPA Web Page documents are stored differently than they might appear on a typical server.

Within LON-CAPA the Web Page and supporting image/multimedia are composed/uploaded via a single link on the course contents, instead of creating folders for the dependencies. Within LON-CAPA any subfolders are 'virtual', in the sense that any subfolders will be created automatically, based on the specified path (e.g., for images, based on the subfolders in the src attribute of the img tag).

The following procedure can be used to compose a web page online:

- **Course Editor -> Other -> Blank Web Page**
- Re-initialize the course.
- Click the **Edit** link (Actions column) in the row containing the new page.
- The main editor window will have a subsidiary menu containing: **Math Rendering/Change View, Edit,** and **Manage Dependencies**.
- The **Math Rendering/Change View** selector changes the rendering engine used to display mathematics, included within the web page inside <m> </m>. This tool permits you to view the web page using various settings. Unless you have configured a setting for the course, each student's settings are used when they view the page. See the section 6.6 for more information..
- Clicking **Manage Dependencies** launches a pop-up window which will check the web page for links and embedded objects (e.g., images) and prompt for upload, if missing, or possible replacement, if found. This is helpful for changing dependent files for an existing page.
- Clicking the **Edit** button will display a textarea which can be used to edit the source HTML, or the "Rich Format" link can be clicked to switch to the WYSIWYG editor. The WYSIWYG editor includes an image button which creates an <img> tag and pops up a modal window in which you can specify a path for the image. You can use a link to external resources, or to published resources. The link to a resource in your published space looks like
  `/res/<domain>/<username>/<path>/photo.jpg` where
  `<domain>/<username>/<path>/photo.jpg` are replaced with the actual names.

  If you create an image link for a file used only for this web page, the path is virtual in the sense that you create a virtual folder structure and it will not be a folder structure that students browse. You should use a relative path, e.g. as if "photo.jpg" is in a subfolder "images". For this type of image, you create the path in the <img> tag before uploading the image using the **Manage Dependencies** button described next.

  The editing window also includes a **Manage Dependencies** button. After adding an <img> tag with the src attribute pointing to a relative URL, click **Save and Edit**. In

WYSIWYG mode a broken image icon will be displayed. Click "Manage dependencies" and you will be prompted to upload an appropriate file from your computer.

Note that an **Edit** link provided in the Functions menu when viewing the page in course context (if your current role has course editing rights) is a shortcut to the editor for this page.

7.8.6 Alternatives

All of these document types are provided for your convenience; you are not required to use them. If, for instance, you prefer to create your own Syllabus, you can create an HTML page and either upload it into the course like any other document (see 7.4.4), or host it on another web server and add it as an External Resource (see 7.4.1).

8 Content Utilities

These tools are accessed via the **Content Utilities** tab on the **Course Editor** page.

8.1 Verify Content

The "Verify Content" utility will attempt to retrieve and render all content in your course (including any dependencies such as image files) and will report the retrieval status and rendering status of each item.

- Select **Course Editor** on the Inline Menu or **Edit course contents** within the Main Menu.
- Click the **Content Utilities** tab on the Course Editor screen.
- Click **Verify Content** to view warnings and errors in resource code.

A retrieval status of "ok" means the file contents were successfully retrieved (including replication from the resource's home server, if required).

A render status of "ok" means that LON-CAPA was able to process the file contents to create the output which would be sent to the user's web browser (e.g., parsing XML for LON-CAPA problems, or HTML for web pages) without error.

In the case of an error, is displayed. Warnings in html pages will not affect your students' scores.

8.2 Check/Set Resource Versions

To check or set the versions of resources imported into your course, do the following:

1. Select **Course Editor** on the Inline Menu or **Edit course contents** within Main Menu.

2. Click the **Content Utilities** tab in the Course Editor screen

3. Click to see which resources have been updated over a specific time frame.

NOTE: When you import a resource into a course, you get the most current resource by default.

You can also fix the version of a resource used in a course, so it will not change automatically should the author republish it.

However, LON-CAPA recommends that you use the default settings to keep all resources up-to-date because most resource changes are improvements by their authors.

There are three parts to the "Check Resource Versions" screen.

- Change display

  Select the time frame for which version changes are to be displayed, and click the Display button to update the listing. If resources changed within the time frame they will be listed in date order with most recently changed listed first.

- Actions

  If you wish to apply a version rule to all resources imported into your course, click the Go button for one of the two options – either always use the most recent published version for all resources, or fix all resources to the version currently in use in the course.

- Version choice(s) for specific resources

  If you wish to fix only specific resources to a particular version, but allow others to use the most recent version, select a version from the select box for each of the resources to be fixed, and click either of the Save changes buttons.

  The "History" column includes links to versioned resources and also links to display the differences between any version and the most recently published one.

8.3 Display/Set Shortened URLs for Deep-linking

Although LON-CAPA is a fully functional LMS/CMS, which provides all the tools needed to run a fully online course, or a hybrid course, other use cases may simply require access to individual LON-CAPA resource(s) without a need for course management functionality.

For such use cases, the standard LON-CAPA course container will continue to be employed by a Course Coordinator to organize resources, set parameters, and control content availability, but students themselves may access the resource(s) from some other context, by simply following a direct link to a particular LON-CAPA resource or folder.

To support the use of deep-linking to an individual resource or folder, URLs of the form: /tiny/<domain>/<unique code> can be generated within a domain. The <unique> code is a six character code which internally maps to either the LON-CAPA's unique identifier (or "symb") for an instance of a resource in a course, or the path to a folder within a course.

As Course Coordinator display the Course Editor menu, and click the "Content Utilities" tab, and then click the "Display/Set Shortened URLs for Deep-linking" link in the "Administration" panel. From there check the checkbox(es) for resource(s) for which deep-link access is needed, and push the "Create Tiny URL(s)' button.

If your LON-CAPA domain has multiple machines, then one machine may have been designated by the Domain Coordinator as a LON-CAPA load-balancer, and/or may operate as the LON-CAPA portal for the domain. In that case the href attribute to set in a link in a web page outside LON-CAPA should point at: https://<yourportalserver>/tiny/<domain>/<unique code>. Otherwise, the href attribute should point at https://<yourloncapaserver>/tiny/<domain>/<unic code>.

If a deep-link is followed from a web browser without an active LON-CAPA session, the user will be prompted to log-in to LON-CAPA. Once authenticated, the user's role in the course to which the deep-link belongs will be selected automatically, and the resource which the deep-link references will be displayed. If the deep-link is for a folder instead of a resource, then a listing of available items in that folder will be displayed as clickable links. If a user has an active Coordinator role in a course, then that role will be selected automatically. Otherwise, if a user nas more than one (non-Coordinator) active roles in the specific course referenced by the deep-link, then a listing of the available active roles will be shown, with the option to select one. Once selected, the resource will be displayed.

8.4 Copy Course Content to Authoring Space

Those with authoring privileges will see **Copy Course Content to Authoring Space** after clicking on Content Utilities from the in-line menu of the **Course Editor** page. This feature allows you to copy the material created with the tools in the **Course Editor** screen into your authoring space. You can then add this material to the LON-CAPA resource pool by publishing it.

9 Supplemental Content

Supplemental Content are auxiliary files the Course Coordinator wants the student to have access to even though not necessarily part of the regular (chronological and/or topic-based) course structure, (e.g., reference material, handouts, etc.). Some files may not be directly viewable or usable in a browser, such as PowerPoint presentations Word documents. Students access supplemental content documents by selecting the **Supplemental Content** tab while viewing the **Course Content**.

As is the case for the Main Content, you may add a **New Folder** (7.3), an **External Resource** (7.4.1), a **Syllabus** (7.8), or a **My Personal Information Page** (7.8).

Changes made to Supplemental Content, such as adding new resources, changing the order, or renaming or removing resources will be visible immediately (no course re-initialization required).

10 Managing the Class List

10.1 Upload a Class List

As Course Coordinator in a class you can upload course rosters containing lists of students, or alternatively lists of teaching personnel (excluding additional Course Coordinators). Intended roles (instructor, TA, student etc.) for each user can be either read from the file, or a default can be specified.

1. Mouseover the **People** item in the inline menu and click **Users** or select **Manage course users** in the Main Menu.
2. At the **User Management** screen, select **Upload a File of Course Users**.
3. Type the path to the file that contains the user list, or click the Browse... button to locate the file on your machine.
4. Select the appropriate file type from the drop-down menu (usually **CSV spreadsheet**). To see how to generate a CSV file, refer to 10.2.
5. Click the Next button.
6. The next screen allows you to associate the uploaded spreadsheet's columns with the necessary student fields, such as: **Last Name**, **First Name**, etc. Use the drop-down menus to make an association for each of the spreadsheet's columns.

   NOTE: If you wish to associate a particular column to more than one field (if, for example, you wish to make the students' initial passwords the same as their student/employee id), click the Reverse Association button. Then you can assign columns of the spreadsheet to more than one field. You can also set the login type, the start/end dates for the students from this page.
7. Once you have the column assignment and defaults set, click the Update Users button to finish.
8. If you had checked the "Full Update" box, after processing of the uploaded file, a list of students who are in the course, but who were not listed in the uploaded file will be displayed, and you will have the opportunity to drop some, or all, of those students.

10.2 Converting to CSV

To upload an Excel spreadsheet into LON-CAPA, you must convert the Excel spreadsheet into a *Comma Separated Value* file (or CSV file for short) as follows:

1. Open the spreadsheet in Excel.
2. Choose **File** and **Save As...**.

3. Select **CSV (Comma delimited)(*.csv)** from the **Save as type:** drop-down menu, *remembering where you save it.*

4. Click **Save**.

5. Click **Ok**, or **Yes** for any windows that may appear in order to create the *.csv file.

You can then upload the CSV file generated, as described in 10.1.

Other spreadsheet programs can also export CSV files. Many of them follow procedures very similar to Excel. Consult your spreadsheet program's documentation for more information.

10.3 Enroll a Single Student

To modify the class list, you must either be the Course Coordinator for that class, or have a custom role with the appropriate "Grant/revoke role of Student" privilege. Do the following:

1. Mouseover the **People** item in the inline menu and click **Users** or select **Manage course users** on the Main Menu.

2. At the **User Management** screen, select **Add/Modify a Student**.

3. You can use the **Search for a user and enroll as a student** section to search for a user by username, or last name, in a specific LON-CAPA domain, or in an institutional directory, if the domain has access to an institutional directory search service. You can also click the Select User link and a window will open with a list of all the users in the course.

   Note: If you know the exact username, you can either use a "username is ..." search in the search section, or type the username in the textbox in the **Enroll one student** section.

4. Click the Search and Enroll or Enroll button, as appropriate.

5. Enter the relevant student information, login type, start/end dates, and optional section affiliation for the student.

6. Click the Enroll Student button to complete the process.

10.3.1 Password Authentication

People are authenticated with a standard username and password scheme. LON-CAPA ships with support for the following authentication scheme:

1. Internally authenticated: LON-CAPA specific passwords, choose this when in doubt.

2. System authentication: authentication using the UNIX authentication scheme on the server.

3. Kerberos authenticated: authentication based on either a Kerberos 4 or 5 server.

4. External authentication: custom authentication integrated with an authentication server other than Kerberos (e.g. LDAP).

If the student or user you are adding to LON-CAPA will be using the same account as another system (e.g. email), then your system administrator can tell you which authentication type you should choose. If you are creating a user that is unique only to LON-CAPA, then select "internally authenticated".

10.4 Modify Student Data

To modify student data, the user must either be a Course Coordinator for the course or have a custom role in the course which includes the privilege to grant and revoke student roles.

1. Select **Manage course users** on the Main Menu.

2. At the **User Management** screen, select **Manage Course Users**.

3. At the **List Users** screen, if necessary set the user status to Currently Has Access, and set the role type to student, from the status and role pulldown menus. The screen will then display the current class list. (The user may also change the status filter to display previously enrolled or some other enrollment status for the class.)

4. In the box headlined "Behavior of clickable username link for each user", click the "Modify a user's information" radio button.

5. Click on the username to modify the student's information. The screen will display the student name and his or her data.

6. Modify the student data.

7. Click the Save button to finish.

10.5 View Class List

As Course Coordinator, you can generate sorted lists of users in a course, filtered by status, role, section, and or group affiliation in a variety of formats (HTML for display, or CSV or Excel for download). As an author (role selected), you can use this same mechanism to display information about co-authors assigned to your authoring space.

1. Mouseover the **People** item in the inline menu and click **Users** or select **Main Menu** and then select **Manage course users**.

2. At the **User Management** screen, select **Manage Course Users**.

3. At the **List Users** screen, select the user status, and role type you wish to view from the status and role pulldown menus. If the course contains users affiliated with sections, an additional pulldown will be available to select the section. A groups pulldown menu is included if groups have been created in the course. Check the checkboxes in the 'Information to show' box for all columns you wish to include in the output. Note: some boxes may be grayed out (e.g., role, unless role type is set to 'Any role').

4. To change the sort order of the users list, click on a column title in the table, to sort by the attribute in that column.

5. Use pulldown menu in the "Action to take for selected users" box, if you wish to modify start/end dates, or section assignments for a number of users all at once.

   Note: a checkbox to include a user (and role) in this bulk action is only available when you have the privileges to modify that role.

   Select an action from the pulldown menu. In all cases, except when revoking a role, this will cause a separate window to open where you will choose the new access dates or section change to apply.

6. Check the checkboxes for the users to modify and click the Proceed button.

Note: When displaying user lists you also have the choice to output the users list to CSV format or Excel format. To do this, select CSV or Excel from the "Output format" pulldown menu.

10.6 Drop a Student

To modify the class list, you must be the Course Coordinator for that class and do the following:

1. Mouseover the **People** item in the inline menu and click **Users** or select **Manage course users** on the Main Menu.

2. At the **User Management** screen, select **Drop Students**.

3. The **Drop Students** screen provides a list of students with current access to your course. Click the boxes next to the names of the students you wish to drop.

4. Click the Drop Students button to finish.

10.7 Automated Enrollment Manager

If your system administrator has configured your LON-CAPA domain to have access to a data feed for class lists for your institution and your domain coordinator has enabled automatic course enrollment updates, then you can control the behavior of these updates using the **Automated Enrollment** Manager.

1. Mouseover the **People** item in the inline menu and click **Users** or select **Manage course users** on the Main Menu.

2. At the **User Management** screen, select **Automated Enrollment**.

3. The **Automated Enrollment** Manager will walk you through configuring automatic enrollment updates.

   - Adds: enable/disable new enrollments for users added to the roster
   - Drops: enable/disable expiration of enrollments for users removed from the roster
   - Enrollment start: a start date/time for auto-enrollment
   - Enrollment end: an end date/time for auto-enrollment
   - Access start: the default start time for student roles added by auto-enrollment
   - Access end: the default end time for student roles added by auto-enrollment
   - Section mappings: Mapping of institutional section numbers to section numbers used within the LON-CAPA course. This mapping permits students in one or more institutional sections to be identified in the LON-CAPA course as belonging to a particular section (or to no section).
   - Cross-listings mapping: Mapping of institutional courses (including section number) to section numbers within the LON-CAPA course. Cross-listing is intended for cases where a course is listed by an institution under more than one institutional course code.
   - Notification messages: Enable/Disable delivery of LON-CAPA mail to specified recipients (selected from active Course Coordinators).
   - Student photos: Enable/Disable automatic import of student photos from an institutional repository. This functionality requires that (a) a conduit has been established from your library server(s) to a directory containing student photos, and (b) the &institutional_photos() routine in localenroll.pm has been customized to use this conduit. Your institution may require the course owner to indicate acceptance of policies governing use of digital student photos. If this is the case, the &photo_permission() routine will have been customized for your domain, and the course owner will need to click a button to acknowledge agreement to the policy, before the option to enable use student photos is enabled in a course.
   - Enrollment status: Students in a course are identified internally by type (auto or manual) depending on whether they were auto-enrolled. Only users of type 'auto' will be dropped from the course if auto-enrollment detects expired enrollment. By default, status type is automatically changed from 'manual' to 'auto', if a manually enrolled student subsequently appears in the institutional roster when auto-enrollment is run. This automatic migration can be prevented for individual students by locking the status type.

- Zero enrollment failsafe: When enrollment comes from more than one institutional course section (including cross-listing), there is a possibility that institutional data retrieval might succeed for some, but not all sections. In order to avoid expiring student roles in sections for which institutional enrollment data could not be retrieved, a failsafe value can be set. When the existing enrollment in a LON-CAPA course section exceeds that failsafe value (an integer), dropping of existing students in the affected section(s)) by automated enrollment update is disabled. A failsafe value set in a course will override a default value set for the domain.

4. You can also use the Update Roster Now link to reconcile the roster for your LON-CAPA course with the most recent institutional class list for the course.

10.8 User Self-Enrollment

Courses can be configured to permit self-enrollment. To configure self-enrollment:

1. Select **Manage course users** on the Main Menu.

2. At the **User Management** screen, select **User Self-Enrollment**.

On the **Configure Self-enrollment** screen settings are available for the following:

- Types and affiliations of users who can self-enroll
- Restrict self-enrollment to students who are listed as officially registered for the course in institutional course roster(s) for sections of the course or for crosslisted courses.
- Opening date/time for self-enrollment and closing date/time.
- Starting and ending dates for access to the course for users who self-enroll.
- Assign a specific section to users who self-enroll

When self-enrollment is set up a warning will be displayed if the course is not listed in the course/community catalog available for the domain. Guidance on how to get the course listed will also be provided if a warning is displayed.

If a course is listed in a catalog users when viewing the course/community catalog will be able to search for the course (there is a checkbox to restrict courses listed in the catalog display to just those courses for which self-enrollment is available). If such courses exist the list of courses will include a self-enroll link for each course. Users can reach the course/community catalog from the Main Menu screen, and also from the roles page. Course Coordinators and other users with advanced roles in the system can also reach the course/community catalog in the same way, although the link on the roles page is less prominent for these types of user.

A user must be logged into LON-CAPA in order to self-enroll in a course. However, if your domain permits it, users may be able to create a LON-CAPA account and log-in. Most commonly self-creation of accounts is permitted where a user can authenticate with a

username and password assigned by your institution to access online services provided by the institution. If a user clicks the "Enroll in course" link from the catalog, and needs to create an account, once the account creation step is completed successfully, the user will proceed automatically to self-enrollment in the course, assuming the user meets any restrictions set for self-enrollment in the particular course.

10.9 Course Groups

1. Mouseover the **People** item in the inline menu and select **Groups** or click "Manage course users" (on the Main Menu, and click the Manage Course Groups link, or click GRPS on the Remote Control (if used).

2. If you have already created groups these will be listed in a table. There are also links to create a new group, or re-enable a deleted group (if any exist), if you have group modification privileges.

3. For a particular group, click the View link to display the group's homepage, and to access collaboration functions in the group. Similarly, click the Modify or Delete links, respectively, to change group settings and/or membership, or to delete a group.

4. For a particular group, membership (by status) and the privileges of each group member can be displayed by clicking the active, previous or future links, available when group members exist with that status.

11 Course Content Settings

For Course Coordinators the inline menu includes a **Settings** dropdown item containing selections for **Course Settings**, **Content Settings**, and **Slots**.

Select **Course Settings** from the dropdown or select **Modify parameter settings (due dates, etc) for resources and the course** from the Main Menu page to set your course parameters.

The **Parameter Manager** screen allows you to control settings for your course and your resources.

From this screen, you can set the resource parameters and their default actions. You can also set which cataloging metadata users can associate with their portfolio files.

Many course coordinators will make extensive use of setting parameters for resources, and for problems in particular. There are a number of modes available. The easiest is probably the helper mode 11.2, which guides you through the process. Once you have some experience with the system, you might use the overview 11.3 and table modes 11.4 more frequently. Several of these actions can be partially automated by setting Parameter Setting Default Actions.

For setting problem parameters, another convenient mode outside the Parameter Manager is navigating to the problem and using the **Content Settings** functionality 12.1.

Finally, you can list all parameters that have already been set in overview mode, and see a log of all changes.

11.1 Cascading Parameter Overview

LON-CAPA uses a powerful and flexible "cascading parameter" system. A "parameter" is anything that can be set for a problem in a course, such as a due date. LON-CAPA parameters can be set for the "entire course", for "all problems in a particular sequence", or for an "individual problem". Fully independently of that, they can be set for "everyone in a course", for "everyone in a section", or for "a single person". More specific parameter settings override more general ones.

Some of the more common parameters include "open date" (when a problem becomes visible for the student to complete), "due date" (the time the student must have the problem done by), "answer date" (an optional date where the solution to the problem becomes visible if they did not complete it earlier), and "weight" (the point value of the problem). Different problem types can also take different parameters; for instance, the instructor can override the "tolerance" for a numerical problem (how close the student must come for a numerical problem to be considered correct), or control the style of the problem (for instance, the system has an "exam" mode where it will give the student multiple choices for a numerical problem, which is useful for printed exams). Problems can also export arbitrary other parameters, which may give instructors the ability to control the difficulty level or select a specific varient of the problem, depending on how the problem was authored.

This parameter system makes most common manipulations of these parameters very easy. If a specific section missed a lab because of a fire drill, that section can have its due date extended for the week without affecting any other section with a single operation. A single student can have their problems opened earlier if they're going to be gone for some excused reason. An entire self-paced learning course can have a global due-date set at the beginning of the course.

11.2 Parameter Helper

The easiest way to set parameters is to use the Helper. The Helper will give you step-by-step instructions for setting the open date, due date, answer display date, tries, or problem weight. With the helper, you can choose to set parameters for the course default, for a particular folder, or for a particular problem. Please note that a parameter set for a folder overrides the default and a parameter set for a problem overrides the folder settings and the default settings. You can set the following parameters with the Helper:

- Open Date (section 11.2.1)
- Due Date (section 11.2.2)
- Answer Date (section 11.2.3)
- Tries (section 11.2.4)
- Weight (section 11.2.5)

11.2.1 Open Date

The open date is the date and time when you first allow the students to view and work on the problems. If no opening date is set, problems are not viewable. You can set a general opening date for the whole course (your domain coordinator might have done this for you), and then your problems become available immediately after importing them. Particularly cloned courses may have an opening date already, which may be in the past.

Note that "Open Date" only controls access to problems. Webpages, PDF-files, etc, are treated differently than problems: they are viewable by default, but access can be limited by "Content Opening Date" and "Content Closing Date."

11.2.2 Due Date

The due date is when the problems are due. The student will not be able to view the problems again until the answer date.

11.2.3 Answer Date

The answer date is when the problem and its answer is viewable to the student after the due date. If the answer date is mistakenly set for a time before the due date, the answer date defaults to the due date. If the answer date is not set, then students will not be able to see the problems after they are due.

11.2.4 Tries

Tries can be set to any integer value. The default value is 99 tries. If you set the course level tries to 10, then every student gets 10 tries for every problem in the course.

11.2.5 Problem Weight

By default, the problem "weight" is equal to the amount of points the problem is worth. If the problem is made up of multiple parts, each with their own submit button, then those parts behave as if they were separate problems, and each one has its own weight.

If you want the change the default, you may want to think of a problem's weight in proportion to other problems. For example, if all problems have a weight of 1,changethen both easy and difficult problems have the same weight. If you choose to change the weight, then the problem weight and points may not equal each other for your course.

The default weight of all problems and problem parts is 1.

11.3 Parameter Overview

There are two modes of the Parameter Overview screen.

The "Modify Resource Parameters" mode lets you see all existing parameter settings, and lets you modify these existing parameters. It also provides a nice overview of everything that is currently set.

The "Set/Modify Resource Parameters" mode lets you determine first which parameters you want to have listed on which level (11.1). These parameters may or may not be previously set.

11.4 Table Mode

Either select **Modify parameter settings (due dates, etc) for resources and the course** on Main Menu to set your course parameters. This will bring you to the **Parameter Manager** screen. From that screen, choose **Edit Resource Parameters - Table Mode**.

You can display parameters for the entire course or just select the enclosing folder (map). Then choose which of the three levels you want to set parameters for.

The three cascading levels (11.1) are:

1. Course level: The course default; will apply the parameter to every resource in the course.
2. Map/Folder level: Will apply the parameter to all resources in a particular folder or map, and will override the course defaults.
3. Resource level: Parameters apply only to one particular problem and those parameters override the map/folder level and course level parameters. You may want to use the Problem Parameter functionality instead (12.1).

If you choose the map/folder level or resource level, you will be given options to choose which folder/map you want to display.

Select the parameters you want to view in table mode. Optionally, you can specify a single user or groups or sections of users for which you want to set parameters.

To set parameters, click on the underscore link in the appropriate location to add your parameter. *Note, when setting resource level parameters, you must make changes under the "for Resource" column only.*

11.4.1 Parameters for an Individual Student

To set content parameters for a selected user, it is recommended that you use the Parameter Helper. However, if you need to use the Table Mode, then do the following:

- Select **Modify parameter settings (due dates, etc) for resources and the course** on the Main Menu.
- On the **Parameter Manager** screen select
- Select **Edit Resource Parameters - Table Mode**.
- At the **Table Mode** screen select the **Parameter Level** from the pull down menu. (See discussion of parameter levels in Table Mode section 11.4.)

- Screen select the enclosing map or folder from the pull down menu. If you choose course level you will skip this step.
- In the section headlined **User Specification (optional)**, type the username or id of the desired user. If you do not know the username or id, then click the Select User link.
- Click Update Parameter Display.
- For **Course Level** and **Map Level** parameters:
  - At the default value column, click on the link for the parameter setting you want to assign (note that parameters without assigned values are represented by). A new window will open.
  - Update the selected parameter.
  - Click Save.

  The default value will now reflect the new parameter setting for the selected user. **Parameter in Effect** will reflect the parameter settings for all other users in the course.

  Repeat the previous three steps as necessary.
- For **Resource Level**:
  - Within the **User ____ at Domain ____** column, click on the link for the parameter setting you want to assign (note that parameters without assigned values are represented by). A new window will open.
  - Update the selected parameter.
  - Click Save.

  The **Parameter in Effect** column reflects the parameter setting that is in effect for the selected user. The last column reflects the value for your username and does incorporate complete cascading within a problem for your username.

  Repeat the previous three steps as necessary.

The parameters priorities are shown lowest to highest, left to right in the tables.

11.5 Course Settings

To set parameters which do not apply to resources but to a course as a whole either select **Course Settings** from the **Settings** dropdown in the inline menu or use select **Main Menu** then **Modify course configuration**.

This will bring you to the **Course Configuration** screen.

On the **Course Configuration** screen check one or more settings you want to change and hit Display. On the **Display/Edit Settings** change the selected settings as desired and press Save Changes.

12 Problem Parameters

12.1 Overview

Go to a problem resource and click on **Content Settings** within the **Functions** bar of the Inline Menu. This will bring you to a screen which is similar to the resource level parameter setting in table format (11.4), except information only shows up for the current problem. *Make sure to only make changes in the* ***for Resource*** *column.*

If the interface seems confusing, then we suggest you use the Helper Mode, see 11.2.

12.2 Allowing Collaboration on an Essay Problem

As a Course Coordinator to set the Maximum Number of Collaborators for a specific problem, do the following:

- Click on **Contents** in the Inline Menu, or select **Table of course contents** on the Main Menu.
- Click on the essay problem that needs the maximum number of collaborators set.
- Click on **Content Settings** within the **Functions** bar of the Inline Menu. At the **Problem Parameters** screen, a table will append to the page with all the parameters that can be set for the specific problem.
- Scroll down to the **Maximum Number of Collaborators** field in the **Parameter Name** column.
- In the Course Columns, click "-" in the general column for entire course, click "-" in the "for enclosing map or folder" for a specific map or folder, click "-" in the "resource column" for a particular resource. A new window will open.
- Update the selected parameter.
- Click **Store**.

13 Course Communication System

Select COM on the Remote Control or Main Menu to be brought to the Communication Screen. If you use the remote control interface, you will know when you have a message waiting for you because the LED light in the upper right-hand corner will continuously blink. All unread messages will be displayed at the bottom of the Main Communication Screen. In addition, on the **NAV** page, a letter icon appears next to any resource with unread feedback messages. The subsections below describe the options available to you on the Communication Screen.

13.1 Send Messages to User(s)

To **send internal LON-CAPA messages**:

1. Select **Messages** on the Inline Menu or **Send and display messages** on the Main Menu.
2. At the **Communication/Messages** screen, select **New Message**.
3. Type the "username" you want to send the message to. Please note that this is not an e-mail address but a LON-CAPA username.

   (*1) Note: If you don't know the username, click on the Select User link. Another screen will open and you can select a user from the list.
4. Choose the user's domain from the dropdown list if different to your domain (which is selected as default).
5. Enter any additional recipients.
6. Type the **Subject** in the "subject" text box.
7. Type the **message** in the text box.
8. **(*1)** If this is a "critical message", select "Send as critical message", see 13.5.
9. **(*1)** Select "Send copy to permanent e-mail address (if known)" to make sure that an external notification e-mail is additionally sent to the user's permanent e-mail address (if exists), independent from the user's personal message notification settings, see 4.4.
10. Click **Send**.

(*1): Only available in course context, i.e. with selected Course Coordinator or Instructor role

13.2 Broadcast Message to Course

A Broadcast Message is sent to all members of a course. To send a Broadcast Message to the course, do the following:

1. Select **Messages** on the Inline Menu or **Send and display messages** on the Main Menu.
2. At the **Communication/Messages** screen, select **New Broadcast Message**.
3. Select the students to receive the message.
4. Add any additional recipients.

5. Type your message in the text box.
6. If this is a critical message, check "Send as a critical message, " see 13.5.
7. Click **Send**.

13.3 Distribute Messages from Uploaded File to Course

You can send individualized messages to your students in one go. To this end create a file with the following format:

username1@domain1: text
username2@domain2: text
username3@domain1: text

For example:

kjohnson123@msu: You received B- on your midterm
gsmith98765@msu: Please stop by during office hours so we can discuss your grade
cblack567891@msu: Congratulations, you received an A on your midterm

To distribute such messages to your students:

1. Select **Messages** on the Inline Menu or **Send and display messages** on the Main Menu.
2. At the **Communication/Messages** screen, select **New Messages from File**.
3. On the **Broadcast Message** screen provide a subject and a general message text to be sent to all recipients.
4. Click on Browse ... and select the file containing individualized messages you have previously created on your computer.
5. If this is a "critical message", select "Send as critical message", see 13.5.
6. Click **Upload and Send**.

13.4 Recording Notes and Face-To-Face Communication

To save records of face-to-face discussions, which will only be visible to course faculty and staff, do the following:

1. Select **Messages** on the Inline Menu or **Send and display messages** on the Main Menu.
2. At the **Communication/Messages** screen, select **Message Log for Selected Users**.

3. On the **User Notes, Face-to-Face, Critical Messages, Broadcast Messages, Archived Messages** screen type the username in the **Username** field and choose the domain using the **Domain** pull down.

   Note: You can also click the Select User link and a new window will open with a list of all the users in the course. Select the user. This will populate the Username field and close the window.

4. Click Retrieve discussion and message records. The screen will show any records previously entered for the user.

5. Enter text in the **New Record** box.

6. To save click Post this record.

13.5 Critical Messages

A "Critical Message" is a message that will appear immediately after the recipient user logs in. The user must acknowledge receipt to continue; it is not possible to use the rest of LON-CAPA until they do so.

Only Course Coordinators and/or Instructors can send Critical Messages.

To send a Critical Message, do the following:

1. Select **Messages** on the Inline Menu or **Send and display messages** on the Main Menu.

2. On each of the message sending screens (**New Message**, **New Broadcast Message**, and **New Messages from File**), there is a checkbox **Send as critical message** which sends this message as a critical message. Selecting **Yes** in reply to **"Require return receipt?"** sends the message as a critical message, but additionally returns a message to you as users acknowledge receipt of the message.

14 Discussion Posts and Feedback

14.1 Resource Discussion

Unless banned by an instructor, all resources in the course can host discussion, which means students may post comments that will appear to all viewers.

For all course members a icon appears on the **Course Contents** screen next to any resource with new discussion postings. In addition, course personnel will see new discussion on their **What's New?** screens within the box headlined **Unread course discussion posts**.

Instructors may allow course participants to post anonymously or not, and course personnel can still see who posted the anonymous messages. "Anonymous" only prevents students

from knowing who posted. (Sometimes instructors or TAs post anonymously to discreetly help the students.) Course personnel may hide or delete inappropriate messages.

To participate in discussion on a resource, click **Post Discussion** at the bottom of a resource. If you want to reply back to a particular post, then click the appropriate Reply link.

To control how discussions are displayed, see "Change the way Discussion Posts are Displayed" section (4.5).

14.2 Giving Feedback

To submit feedback for a specific page, do the following:

1. Open the resource page where you want to submit feedback.
2. Click **Feedback** at the top in-line menu of this resource.
3. At the **Question/comment/feedback** screen, check one of one of the listed feedback types to direct where your feedback is sent (see feedback to author 14.2.1, feedback about content 14.2.2, 14.2.3, contribute to discussion 14.2.4, and contribute anonymously to discussion 14.2.5 for further explanation).
4. Click the checkbox to optionally add to your blog.
5. Type your feedback, comment, or question in text box.
6. If applicable, add an attachment.
7. Click **Send**.

14.2.1 Feedback to Resource Author

Only the author of the resource can view this feedback. The author receives the feedback as a message on their **Communication/Messages** screen. The feedback automatically becomes part of the problem's metadata. Feedback understands smilies, LaTeX, and HTML. Instructors can change feedback and discussion options within the course environment.

14.2.2 Question About Resource Content

The feedback sent with this option is posted privately to the instructor specified in the Course Environment as the person to receive resource content questions. If no instructor is defined in the Course Environment, this option does not appear in the feedback window. The instructor is notified that a question is waiting by the appearance of a little envelope link near the problem on the **Course Contents** screen. The instructor can also see the message from the **Communication/Messages** screen. The student's version of the problem, along with previous submissions, is attached to the message. When the instructor replies to the message, the student is notified that a reply is waiting by that same envelope link next to the problem name on the **Course Contents** screen.

14.2.3 Question/Comment/Feedback About Course Policy

Similar to the option above except the message does not include the student's view of the problem. This option is also dependent on whether the correct field is defined in the Course Environment.

14.2.4 Contribution to Course Discussion of Resource

Instead of the text sent as a message to an instructor, the text is displayed publicly at the bottom of the resource. Course Coordinators and Instructors can hide or delete discussion postings. The student's name in the posting is a link to his or her personal information page. Everyone in the class is notified of new discussion with a little bubble icon next to the problem name on the **Course Contents** screen.

14.2.5 Anonymous Contribution to Course Discussion of Resource

Same as above except that the student's real name is not visible to other students and is replaced by the word "anonymous" or by the student's screen name. Instructors and Course Coordinators can see the student's name.

14.3 Feedback Addresses

To specify who gets which feedback messages, do the following:

1. Select **Modify course configuration** on the Main Menu.
2. At the **Course Configuration** screen check **Feedback Messages** and click Display.
3. For each feedback type enter usernames as desired. You can also click the Select User link.
4. Click Save Changes.

14.4 Disabling Discussion

By default, all users of a course can use the discussion features LON-CAPA provides. Only Course Coordinators have permission to disable discussion for a course. A Course Coordinator can also disallow resource discussion for specific roles or for specific users.

To disable discussion, do the following:

1. Select **Modify course configuration** on the Main Menu.
2. At the **Course Configuration** screen check **Discussion and Chat** and click Display.
3. For each disabling mechanism select specific roles as desired.
4. Click Save Changes.

15 Chart Student Progress

The chart is designed to give you quick access to your students performance data. It has many output options (see 15.7) and output formats (see 15.6).

15.1 Homework Performance Overview

To get an overview of how well the students are performing on their homework in a course, select **View the course assessment progress chart** on the Main Menu.

On the **Chart** screen click the Generate Chart button to see the default chart for your class. The default chart displays a line for each student's username with the scores for each problem grouped by folder and the total scores for each folder. Read below for more information about the settings you can change from the chart default.

15.2 Sections

You can limit your chart display to one or more sections. Click on a section and drag your mouse down to select multiple sections in a row. To select multiple sections that are not in a row, hold down the Ctrl key on your keyboard while selecting the sections with your mouse.

15.3 Student Data

By default, only the student's username appears on each line. You can choose to see additional information about each student per line by selecting from this menu. Click on a selection and drag your mouse down to select multiple selections in a row. To select multiple selections that are not in a row, hold down the Ctrl key on your keyboard while selecting your choices with your mouse.

15.4 Enrollment Status

The default is to see students who currently have access to your course. You can choose to view dropped students by selecting "Previously Had Access", and students who are enrolled in the course but have not reached their access start date by selecting "Will Have Future Access". You can also choose to view all students (students who currently have access, dropped students, and students who are enrolled in the course but have not reached their access start date) by selecting "Any Access Status".

15.5 Sequences and Folders

The default is to view all folders. You can choose to view one or more specific folders if you wish. Click on a selection and drag your mouse down to select multiple selections in a row. To select multiple selections that are not in a row, hold down the Ctrl key on your keyboard while selecting your choices with your mouse.

15.6 Output Format

Output Formats

The following are the output formats currently available for the chart.

- **HTML, with links:** Output HTML with each symbol linked to the problem which generated it. Problems the students have not attempted are not linked to. By including links, the output web page can become very large. If your browser crashes on the full display, try selecting less folders to view or choose to output the HTML without links.
- **HTML, with all links:** Output HTML with each symbol linked to the problem which generated it. This includes links for unattempted problems. By including links, the output web page can become very large. If your browser crashes on the full display, try selecting less folders to view, or choose to output the HTML without links.
- **HTML, without links:** Output HTML without any links to any of the students' homework problems.
- **Excel** Output an Excel 95 compatible file. Excel is limited to 256 columns, so you may be asked to reduce the number of sequences or folders you have selected. There is currently a 7 Megabyte limit on the size of the Excel files LON-CAPA can generate.
- **CSV** Output a comma separated values file suitable for import into a spreadsheet program. This method does not have any limitations on the size or number of columns that can be exported.

15.7 Output Data

Output Data

The data which can be output by the chart is described below.

- **Scores Summary:** The overall scores on each sequence are displayed.
- **Scores Per Problem:** The students' scores on every assessment in the selected sequences are displayed. Students received that many points on the problem. A '*' indicates the score was not a single digit. Excel and CSV output does not have this limitation and shows all scores properly.

0-9	Current student score on the problem.
*****	Student score on the problem was not a single digit (Excel and CSV output do not have this limitation).
u	Student answer has been submitted but has not been graded.
d	Student saved a draft solution but has not submitted a solution.
x	Student was excused from the problem.
blank	Student has not attempted the problem.

- **Tries** The number of tries a student took to complete each problem successfully is displayed. The values are displayed as follows:

1-9	Number of attempts before the student got the problem right.
*****	Student required 10 or more attempts to successfully complete the problem.
.	Student attempted the problem but was not able to solve it.
x	Student was excused from the problem.
+	Problem was marked correct by override.
-	Problem was marked incorrect by override.
u	Student has submitted to a handgraded problem which has not been graded.
blank	Student did not attempt the problem.

- **Parts Correct** The total number of correct problem parts in each sequence will be displayed.

16 Grades and Submissions

LON-CAPA automatically grades all online homework problems by default except for essay problems and Bridge Tasks. However, the Instructor and Course Coordinator both have permission to override the computer scores and submit their own grades. To access the **Grading** screen:

1. Navigate to the problem or a problem within a sequence you want to grade.

2. Click on **Content grades** within the **Functions** bar of the Inline Menu.

The **Grading** screen provides these functionalities:

- Select **Select individual students to grade** to manually grade the submissions on the current problem for one or more students. Go to section 16.1.1 for more information.

- Select **Grade ungraded submissions** to manually grade those submissions to essay problems which are ungraded so far.

- Select **Grading table** to manually grade the submissions on the current problem for students in a section or group. Go to section 16.1.2 for more information.

- Select **Grade page/folder for one student** to manually grade for a single student all submissions within a particular page or folder. Go to section 16.1.3 for more information.

- Select **Download submissions** to download document submitted by students on an essay problem.

- Select **Upload Scores** to grade a Score Upload Form. Go to section 16.2 for more information.
- Select **Process Clickers** to upload students' answers collected via clickers. Go to section 23.1 for more information.
- Select **Grade/Manage/Review Bubblesheets** to grade a Bubblesheet Exam. Go to section 16.3 for more information.
- Select **Verify Receipt Number** to verify a receipt number. Go to section 16.4 for more information.

16.1 Hand Grading and Viewing Submissions

16.1.1 Current Problem: For One or More Students (Use This for Essay Grading)

1. At the top of the **Select individual students to grade** screen, select the students you want included using one of the following choices:
   - **with any status**: any student in the course or selected section
   - **with submissions**: any student who submitted an answer
   - **with ungraded submissions**: any student who submitted an answer or essay to an ungraded, hand-graded problem.
   - **with incorrect submissions**: any student who has made a submission which the computer or instructor has marked incorrect.
2. Click Next.
3. On the **Student Submissions** screen select how you wish to see the student's version of the problem along with the answers.
   - **no** will show no problem texts
   - **one student** will show only the first student's problem text; this is useful for non-randomized questions.
   - **all students** will show the problem text for all students.
4. Change **Grading Increments**, if desired.
5. If this is an essay problem, check the **Check For Plagiarism** box, if desired.
6. Select the student(s) to view, grade, or regrade.
7. Click the Next button.

8. At the **Modify grades** screen, review the answers and select the points you wish to assign the student(s). You also have the option to excuse the student(s) from the problem by using the **Grade Status** pull down menu.

   Note: The computer has automatically graded all the Problems with a red check mark. You can of course change the scoring for these problems, but there are few faster ways to alienate your students then marking things as incorrect the computer said were correct.

9. After you have finished viewing or manually grading the problem answers, choose one of the following options:

   - Use the pull down menu after the Save & Next button to select the number of new students you want to view or grade. Click Save & Next.
   - Click Next to display the next student from your selection *without* saving any changes.
   - Click Previous to display the previous student from your selection *without* saving any changes.

10. When you are done grading, exit the screen by clicking **Return to Last Location** in the Inline Menu.

If you happen to be grading an essay question, it will make sense for you to want to grade just the students with ungraded submissions and then select the first student on your list. Grade this student's essay and then select Save & Next to cycle through all of your students. If you leave, all you need to do is return to the grading screen and again choose only students with ungraded submissions. When grading essay questions, LON-CAPA will give you essay grading keyword tools at the top of each grading page. For example, if you want the keyword "velocity" to be highlighted in every essay submission, just click List and type the word velocity. After grading a few essays in this example, you may realize that you want the keyword "vector" to be highlighted, this time you highlight the word on your screen with your mouse and then click the link Paste Selection to List. The keyword "vector" is now added. The Highlight Attribute choice gives you options to change the default highlighting scheme. For each student, you can also click on the option Compose message to student and leave a message for your student to read next time he or she visits the problem.

16.1.2 Current Problem: For All Students in a Selected Section or Course

1. At the top of the **Grading table** screen, select section, groups and access status of the student you want to grade. Choices for access status are:

   - **with any status**: any student in the course or selected section
   - **with submissions**: any student who submitted an answer
   - **with ungraded submissions**: any student who submitted an answer or essay to an ungraded, hand-graded problem.

- **with incorrect submissions**: any student who has made a submission which the computer or instructor has marked incorrect.

2. Click Next.

3. On the **Modify grades** screen, you will see a table of student grade data for your class or selected section. You have two options:

   - **Assign a common grade to tho class or section**: Select the point value you wish to assign in the box under the **Assign Common Grade to Class** heading. You may also wish to excuse a problem using the **Grade Status** pulldown menu. Excusing a problem will remove the problem score from the total IF the student has not already received credit on the problem. For example, say your current folder is worth 1 point while the folder is worth 15 points. The students who have credit on the problem will get their total score out of 15 points; however, the students who have not received credit will get their total score out of 14 points.
   - **Assign scores for specific students**: Input the point value you want to assign to each student in the appropriate location.

4. Click Save. The **Store grades** screen will display.

16.1.3 The Complete Sequence: For One Student

1. At the top of the **Grade page/folder for one student** screen, select section, groups and access status of the student you want to grade. Choices for access status are:

   - **with any status**: any student in the course or selected section
   - **with submissions**: any student who submitted an answer
   - **with ungraded submissions**: any student who submitted an answer or essay to an ungraded, hand-graded problem.
   - **with incorrect submissions**: any student who has made a submission which the computer or instructor has marked incorrect.

2. Click Next.

3. On the **Select student** screen, use the pull down menu to select the folder with problems you wish to grade. (By default, the folder listed is the folder the current problem resides in.)

4. Select **yes** or **no** to view problem text.

5. Select the submission detail level you wish to view.

6. Select the student or the code of a coded exam.

7. Click Next.

8. On the **Grade student** screen scroll down and view, grade, or regrade the problems.

9. Click Save.

10. The **Store grades** screen will display the scores for the problems in the folder.

16.2 Upload Scores from File

Click Browse to browse your machine to find a CSV file and then click Upload. On the next screen, specify which data is in which column. Your CSV file needs the username, partial credit factor, domain name of msu, and the problem status for each student. If you set a weight of 10 for your problem and the student gets all 10 points, then you assign the student a partial credit of 1. A student who gets 8/10 has 0.8 for her partial credit factor. Below is an example CSV snippet:

```
thoma5678,0.6,msu,correct_by_override
smith1234,0.8,msu,correct_by_override
```

16.3 Grade Bubblesheets

Use this option to grade a LON-CAPA Bubblesheet exam. See section 21 about creating and grading exams.

16.4 Verify a Submission Receipt Number

When a student receives notification that they submitted a correct answer for a problem, they are given a receipt of their submission. If a student claims that her data has somehow been lost, then you can easily recover this data with the receipt number. This option is mainly reassurance for the student because they can keep track of their receipts. It is also reassurance for the instructor because she can request that students keep track of receipts before contacting her with information about possible data loss.

To verify a receipt navigate to the problem under discussion and select **Content Grades** within the **Functions** bar of the Inline Menu. On the Grading screen select **Verify Receipt Number**, fill in the receipt number, and press Verify Receipt Number.

16.5 Viewing Student Submissions

Course Coordinators, Instructors, and Teaching Assistants are able to edit grades. If course personnel are instead assigned a custom role which only includes permission to view grades, but not edit them, then the grading interface for display of submissions and current grades is similar to the interface for editing grades, except for the following:

- **Upload Scores**, **Process Clicker**, and **Grade/Manage/Review Bubblesheets**
  These items are absent from the Automated Grading panel in the top level grading menu page for a user with rights to view, but not edit grades.

- **Grading table** display and **Grade page/folder for one student** display
  Save button is grayed out for a user with rights to view, but not edit grades.

- **Send Messages** and **Grading Increments** display options
  For a user with rights to view, but not edit grades, after following the link (see section 16.1.1) Select individual students to grade, these two items will be absent from the table used to choose the amount of grading detail to display. Detailed grading information for each student will be missing the Send Message and Assign Grades boxes in this case.

17 Statistics

17.1 Overall Problem Statistics

The **Overall Problem Statistics** page lets you view performance statistics on all problems. This page displays the following data about the **Folders/Sequences** selected for evaluation:

- **#Items**

  The number of assessment items (problem parts) in the sequence.

- **Score** and **Count** Statistics

  For the score, the product of the problem weight, the percent awarded, the count, and the number of problem parts correct, the following data are computed:

  - **MEAN**
  - **Standard Deviation**
  - **Maximum**
    The highest achieved score or count in the data set.
  - **Minimum**
    The lowest achieved score or count in the data set.
  - **N**
    The number of students evaluated.

- **KR-21**

  This statistic measures the internal reliability of the data set. **This statistic is relevant for exams only.** Let K be the number of items in your test, M the mean score on the test, s the standard deviation of the scores on your test, then the KR-21 statistic, rk, is given by the formula

$$rk = \frac{K}{K-1} \cdot \frac{1-(M*(K-M))}{Ks^2}$$

You have the option to have this statistical data output to an Excel file.

Clicking on the problem name will open a view of the problem in a separate window.

The **Overall Problem Statistics** page displays the following data about the problems currently in the course:

#Stdnts: Total number of students attempting the problem.

Tries: Total number of attempts to solve the problem.

Max Tries: Largest number of attempts to solve the problem by a student.

Mean Tries: Average number of attempts.

S.D. tries: Standard Deviation of the tries.

Skew Tries Skewness of the students' tries.

$$\frac{\sqrt{\sum (Xi - Mean)^3 / \#Stdnts}}{\sigma^3}$$

#YES: Number of students who solved the problem correctly.

#yes: Number of students who solved the problem by override.

%Wrng: Percentage of students who tried to solve the problem but were unable to.

DoDiff: Degree of Difficulty of the problem.

This statistics give a measure of how many attempts it took the students to get the problem correct. Those students who did not get the problem correct are not counted. A value close to 0 indicates most students who got the problem correct did so on the first attempt. A value close to 1 indicates many attempts were required for students to get the problem correct. A negative value indicates students were given points without attempting the problem. A value of 'nan' means there were no attempts made on the problem.

$$1 - \frac{\#YES + \#yes}{Tries}$$

DoDisc: Degree of Discrimination of the problem.

The students are grouped based on their scores on the sequence which contains the homework problem. The percent score of the bottom 25% of the students is subtracted from the percent score of the top 25% of the students. This yields a number from -1 to 1. 1.0 indicates all of the good students answered the problem correctly and none of the poor students answered it correctly. Conversely, a score of -1.0 indicates all of the good students got the problem wrong and the bad students did well.

weight: The weight of the problem in the course ("points"). The value shown is the weight of the problem for the individual computing the statistics. Individual student or section variations are not shown.

Sequence Statistics: Compiled statistics on problems based on their containing sequence, are also shown. The following data are shown:

#Items: The number of problem parts in the sequence.

Score Mean, **Score STD**, **Score Max Score Min** The mean, standard deviation, maximum, and minimum of the scores of the selected students on the given sequence.

Score N The number of the selected students who submitted answers to problem parts in the sequence.

Count Mean, **Count STD**, **Count Max**, **Count Min**: The mean, standard deviation, maximum, and minimum count of correct problem parts of the selected students on the given sequence.

Count N The number of the selected students who submitted answers to problem parts in the sequence.

KR-21 The KR-21 reliability statistic measures the internal reliability of a test or exam.

To compute the KR-21 reliability statistic the following formula is used:

$$KR-21 = \frac{K}{K-1} \cdot \left(1 - \frac{M \cdot (K-M)}{K \cdot s^2}\right)$$

Where

K is the number of items in your test

M the mean score on the test

s the standard deviation of the scores on your test

17.2 Detailed Problem Analysis

The Detailed Problem Analysis gives you detailed statistics and graphs of student performance on option response problems. For example, you can learn that many of your students set a particular foil to true when it is really false. With this information you can give your students feedback in order to help them better learn the concept the problem assesses. You have the option to choose to analyze your data over tries or time, analyze your data as concepts or foils, and select how many plots of the data you wish to view. Help links are provided on the the Detailed Problem Analysis screen which explain these options, in summary:

1. Analysis over **Tries** results in each plot showing the results of a specific attempt by all students, meaning the first plot will show the results of the first attempt by all students, the second will show the results of the second attempt, and so on. Those students who get the problem right on the first attempt won't have a second attempt so the amount of data for each plot will decrease.

2. Analysis over **Time** results in each plot showing the results of all attempts made during specified intervals.

17.3 Submission Time Analysis

This option gives a display and analysis of submission times on assessments. You can see how the number of submissions varies while the problem is open. You can also see how the number of students with the problem correct increases over time.

17.4 About Clear and Update Cache

The **Statistics Cache** manages the data used in computing student performance statistics.

Much of the time spent computing statistics is actually used to compile student data into a more useful format; the temporary course cache. Normally student data is maintained in an archived format, which does not provide for rapid access. Since each student's data is stored on their home server in their account, and not with the course, it takes time to compile the data and store it in the temporary course cache. All of the statistics modes use the same cache so the process of compiling the student data does not need to be repeated when successive statistics are requested.

Only those students who are involved in the current calculation will have their data compiled. When you modify the selected set of students, by changing the section you are computing statistics with, the caches will be updated.

The temporary course cache is maintained for 2 days on the server used for the statistics computation.

The cache management buttons, marked **Clear Caches** and **Update Caches**, appear when the temporary course caches are in use.

Clear Caches causes the entire cache for the course to be flushed, discarding all the current contents. The cache is then rebuilt to display the desired statistics. The normal use of statistics should not require you to press this button, but it is here for completeness.

Update Caches checks the students' records for updates since when their data was compiled. Any changes to the students' record for your course will be reflected after this button has been pressed. The **Update Caches** button is useful if your students are currently completing a homework set, and you wish to evaluate their progress in the timeframe your statistics were generated.

18 Spreadsheet

18.1 Introduction to the Spreadsheet

The **Spreadsheet** is used to implement complex grading policies in your course. It has the flexability to implement most grading schemes and it provides access to all the parameters associated with the homework and exams in your course.

For basic information about the structure and function of the spreadsheet, see **Spreadsheet Hierarchy** (18.3) and **Spreadsheet Layout** (18.3.2).

For help creating and editing spreadsheets, see **Spreadsheet Files** (18.4) and **Spreadsheet Editing Overview** (18.4).

To access the spreadsheet functionality select **View calculated grades (Spreadsheet)** on the Main Menu.

18.2 Student View

The student view of the spreadsheet is restricted to the student's personal data, calculated by the Student Spreadsheet. Students are only able to view their personal data in courses where the environment has been set to allow the student view of the spreadsheet, see **Changing Course Environment for Student Access to Spreadsheet** (20.1). To view their data, students will click the **Grades** item in the inline menu displayed on any LON-CAPA page.

Students can also access display of their own grades from the Main Menu by pressing **View current problem status and grading information**.

If the course contains assessments which indicate the student should not be able to view the results, as is the default for an exam, the row will appear blacked out and the data will not be present. Once the answer date has passed for the resource, the row will be shown.

Students cannot modify the spreadsheet in any way. Students are not able to view the Assessment Spreadsheets or Course Spreadsheet.

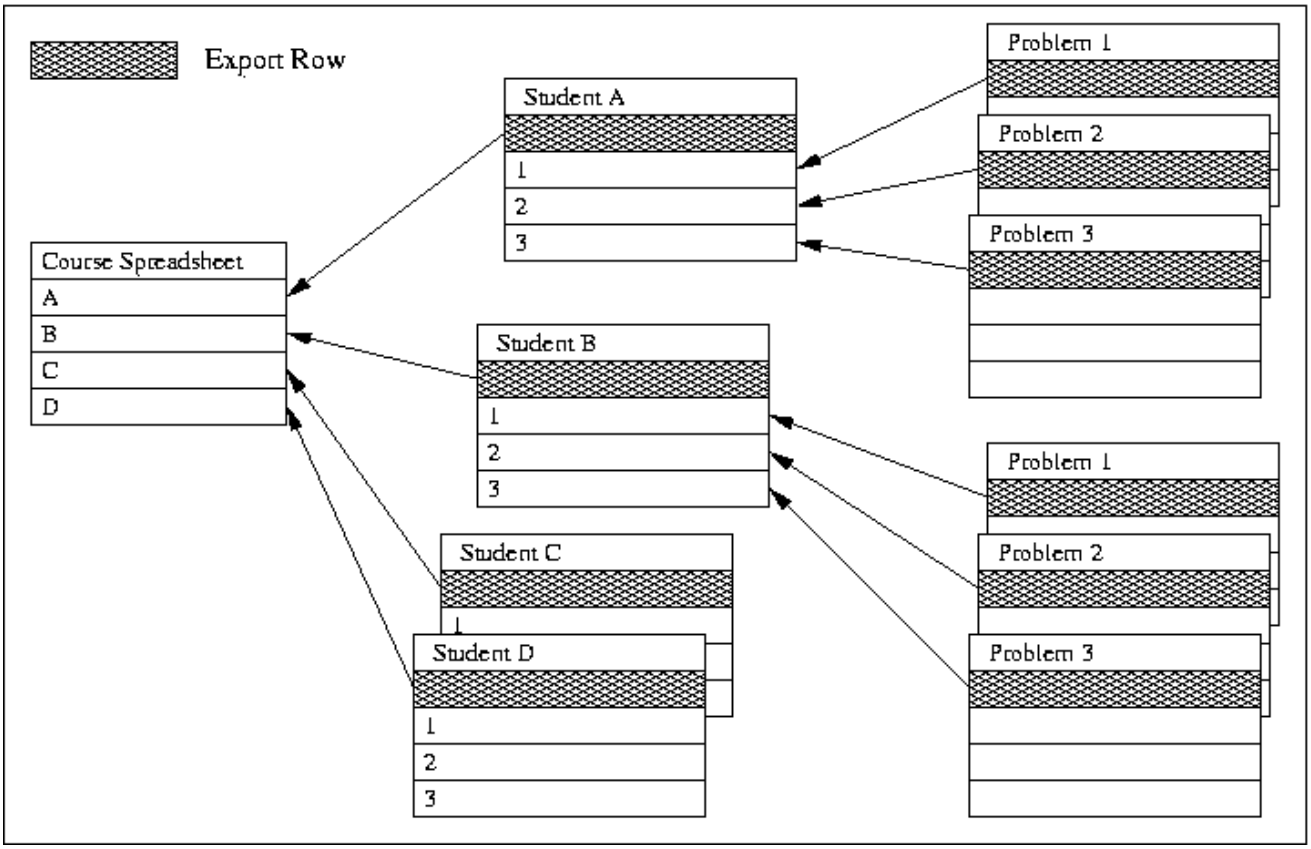
18.3 Spreadsheet Hierarchy

There are three different types of spreadsheets inside LON-CAPA: Assessment Spreadsheets, Student Spreadsheet, and Course Spreadsheet.

1. **The Assessment Spreadsheets**

   An assessment-level spreadsheet provides access to all of the parameters associated with a student's performance on a particular homework assignment, quiz, or exam. Each student has an assessment spreadsheet for every assessment in the course. The assessment spreadsheets provide data to their parent, the student level spreadsheet, via the assessment spreadsheet **export row** (18.3.3). Multiple assessment spreadsheets can be used in cases where the instructor configures grade categories.

2. **The Student Spreadsheet**



The student level spreadsheet summarizes the assessment spreadsheet data for the students. There is only one default student level spreadsheet definition, but the data varies for each student. The student spreadsheet is programmed to permit the instructor to assign different assessment spreadsheets for different grade categories or other uses. The data present in the student spreadsheet is imported from the **export row** (18.3.3) of each assessment spreadsheet for all of the assessments currently in the course. The student spreadsheets pass summary data to the course-level spreadsheet via the student spreadsheet **export row** (18.3.3).

3. **The Course Spreadsheet**

   The course spreadsheet contains all of the summary data for the students in the course.

18.3.1 The Three Spreadsheet Levels

Each Student and Assessment level spreadsheets permit sophisticated calculations. The summary values that are to be passed to the parent spreadsheet are summarized in the **export row** of the sheet. The figure shows the spreadsheet hierarchy and indicates the flow of information.

1. **The Course Spreadsheet**

The course spreadsheet contains all of the summary data for all the students in the course.

2. **The Student Spreadsheet**

   The student level spreadsheet summarizes the assessment spreadsheet data for the students. There is only one default student level spreadsheet definition, but the data varies for each student. The student spreadsheet is programmed to permit the instructor to assign different assessment spreadsheets for different grade categories or other uses. The data present in the student spreadsheet is imported from the **export row** (18.3.3) of each assessment spreadsheet for all of the assessments currently in the course. The student spreadsheets pass summary data to the course-level spreadsheet via the student spreadsheet **export row** (18.3.3).

3. **The Assessment Spreadsheets**

   An assessment-level spreadsheet provides access to all of the parameters associated with a student's performance on a particular homework assignment, quiz, or exam. Each student has an assessment spreadsheet for every assessment in the course. The assessment spreadsheets provide data to their parent, the student level spreadsheet, via the assessment spreadsheet **export row** (18.3.3). Multiple assessment spreadsheets can be used in a course, facilitating organizing assessments into categories or for other purposes.

18.3.2 Layout

This section describes the layout of each level of spreadsheet. See the section on the **Spreadsheet Hierarchy** (18.3) for a description of the types of spreadsheets and their data-flow relationships.

General Characteristics

Each spreadsheet has 52 columns and a variable number of rows. The columns of the spreadsheets are labeled 'A-z'. The rows of the spreadsheets contain data appropriate to the spreadsheet as described below. The section **Spreadsheet Row Numbers** (18.3.5) describes how row numbers are assigned.

Assessment Spreadsheet Layout

There are two special rows on the top of the assessment spreadsheet. The first is the **template row** (18.3.4). The second row is the **export row** (18.3.3).

The main body of the assessment spreadsheet contains the parameters associated with the assessment. The parameter values appear in the "A" column of the spreadsheet and cannot be edited. The remainder of the spreadsheet columns, labeled "B-z", can be edited and used for computations. See **Referencing Spreadsheet Parameters** (18.4.3) for information on how to reference a parameter value in the spreadsheet.

Student Spreadsheet Layout

The student spreadsheet has both a **template row** (18.3.4) and an **export row** (18.3.3).

The main body of the student spreadsheet contains the export rows of the assessments in the course. Each assessment appears beneath the title of the folder or sequence which it belongs to. The first 26 columns of the main body of the spreadsheet, "A-Z", are the export data from the assessments and cannot be edited. The remaining columns, "a-z", can be edited.

Course Spreadsheet Layout

The course spreadsheet contains the data exported from each student level spreadsheet.

The two topmost rows are the **template row** (18.3.4) and a summary row. The remainder of the spreadsheet it taken up with student data. Each student spreadsheet exports one row to the course spreadsheet. The first 26 columns, "A-Z", contain the student data and cannot be edited. The remaining 26 columns "a-z", can be edited.

18.3.3 Export Row

The export row determines what information is passed to the next higher spreadsheet in the spreadsheet hierarchy (18.3). The first 26 columns of the row, labeled "A-Z", are exported. The remaining 26 columns, labeled "a-z", are not and may be used for supporting computations. The export row is row number 0.

18.3.4 Template Row

The template row allows you to quickly fill in columns of your spreadsheet. If a cell in the template row has a value or formula, every cell in that column of the main body of the spreadsheet will be given the same value or formula. If a cell in the spreadsheet already has a value, that value will be preserved.

Using the "#" notation to specify rows is recommended. See **Referencing Spreadsheet Cells** (18.4.2) for more information.

18.3.5 Row Numbers

LON-CAPA ensures every row in a spreadsheet is uniquely and persistently assigned a row number. Once a row number is used, it cannot be reused. The following sections describe the consequences of this and answer "why are the rows of the spreadsheet out of order?."

Assessment Spreadsheet

Every parameter associated with an assessment has a unique row in the assessment level spreadsheet. As new parameters are encountered they are assigned the next available row number. Adding a parameter to an assessment thus results in the new parameter appearing at the bottom of the spreadsheet. Since the default spreadsheet definition must cover all of the assessments in the course, there are likely to be a large number of parameters available.

Student Spreadsheet

The student level spreadsheet displays information about each assessment in the course. The row numbers are initially assigned based on the order in which assessments appear in the course. If a new assessment is added at a later time, it will be assigned the next higher

row number. Regardless of the row number, the assessment will appear in the proper place in the course structure.

Course Spreadsheet

The rows of the course spreadsheet are assigned to students when they are encountered processing the class list. Each student is assigned a row number the first time they are present in the course. The rows are listed alphabetized by the students full name and the row numbers are assigned in this order. If a student is later added, they will appear in the proper place alphabetically in the spreadsheet but their row number will not be in sequence.

18.3.6 Authoring Spreadsheet Files

To use a spreadsheet in multiple courses, authors can create spreadsheet XML files in their authoring space. Published spreadsheets can be imported into courses. See **Loading a Spreadsheet Definition from a Published File** (18.4). The spreadsheet syntax is illustrated by the following example demonstrating both text and formulas:

```
<field col=A row=0>‘Available Points:’</field>
<field col=B row=0>&SUM(‘X*’)</field>
<field col=C row=0>‘Awarded Points:’</field>
<field col=D row=0>&SUM(‘Z*’)</field>
```

See **Modifying the Spreadsheet** (18.4) for more information on programming cells. Very complex calculations can be performed in the cells. The file must be saved in authoring space with the extension .spreadsheet. Currently, a spreadsheet must be imported into authoring space as a .txt file and then renamed to a .spreadsheet. After it is published with the .spreadsheet extension, it can be imported into a course.

18.4 Modifying the Spreadsheet

If you have permission to edit a spreadsheet you will also have permission to save and load spreadsheet definition files.

Default Spreadsheets

There are three default spreadsheets, one for each level. These are called `default_classcalc`, `default_studentcalc`, and `default_assesscalc`. These are the starting spreadsheets for every class.

Modified Spreadsheets

When you modify a spreadsheet you begin working with an temporary copy. You may save the spreadsheet using the Save as button on the spreadsheet. Fill in a name and click on the Save as button. You may also use the Save as & Make This Sheet the Default button to set the current spreadsheet definition as the default for this level.

Loading a Spreadsheet Definition from a Published File

Using the Select Spreadsheet File link opens the LON-CAPA resource browser. Only files with the extension `.spreadsheet` can be selected. The spreadsheet definition file must be valid XML. See **Authoring Spreadsheet Files** (18.3.6) for information on creating spreadsheet files.

Setting the Assessment Level Spreadsheets used to Calculate Grades

In the student level spreadsheet every assessment in the course has a spreadsheet definition file associated with it. The spreadsheet definition used for each assessment row is selected using a drop-down option selector in the **Assessments** column. Initially this spreadsheet is "Default", meaning the current default assessment spreadsheet will be used to compute the students grade. Also, a dropdown option selector is provided to set the assessment spreadsheet for each folder/sequence.

Changing the spreadsheet used for an assessment modifies the student level spreadsheet, so you must use the Save as button to save the current student spreadsheet.

Spreadsheet Editing Overview

The strength of the spreadsheet is its ability to be modified to reflect just about any grading method used in a course. The following topics should prove helpful when getting started editing spreadsheets.

- **Cell Editing** (18.4.1)
- **Referencing Cells** (18.4.2)
- **Referencing Parameters** (18.4.3)
- **Special Functions** (18.4.4)
- **Examples and Comments** (18.4.5)
- **Examples and Comments on Assessment spreadsheets** (18.4.6)

18.4.1 Cell Editing

To edit a cell in the spreadsheet, move your mouse pointer over it until you are able to follow a link. Click on the link to open up an editing window. The current contents of the cell will be shown and can be modified. Pressing the Accept button will cause the spreadsheet to be updated with the new formula. You will then be working with an unsaved modified copy of a spreadsheet. See **Spreadsheet Files** (18.4) for information on loading and saving spreadsheets. Pressing the Discard Changes button will discard any changes you have made to the contents of the cell.

What goes in a cell

The cells of the spreadsheet contain a mixture of Perl commands and LON-CAPA specific functions (18.4.4). Most non-IO Perl functions work in cells.

18.4.2 Referencing Cells

Cells

Cells may be specified by simply writing their name enclosed in either single quotes or double quotes. For instance, `'A17'` and `''A17''` will be replaced with the value in row A column 17 before the Perl command is evaluated.

Ranges

Ranges specify rectangles of various shapes in the spreadsheet, just as ranges do in traditional spreadsheets. Ranges must be enclosed in quotes. Examples of legitimate ranges:

- `'*'` - all rows, all columns
- `'B*'` - all rows in column B
- `'*5'` - all columns in row 5
- `'C5'..'F25'` - all cells in the rectangle between C5 and F25

Many functions accept ranges, see **Special Functions** (18.4.4). For example, `&SUM('d*')` will add up all cells in column d.

Special References

There is an additional means of referencing cells most used in the **template row** (18.3.4). By using a '#' in the place of a row number the spreadsheet will replace the # with the current row number. For example `'B#'` will be replaced with the contents of cell $B7$ in the row 7 and the contents of $B8$ in row 8.

18.4.3 Referencing Parameters

Assessment parameter names are listed when viewing the assessment-level spreadsheet in the column label 'Item.' In the assessment-level spreadsheet, the parameters are available for calculation in three ways.

1. Reference the cell containing the parameter value: `A10`
2. Reference the parameter value by string name in brackets: `[parameter_0_weight]`

   In each of these two cases, the value of the parameter will replace the reference before the Perl code in the cell is executed.
3. Use the `&PARM()` function, e.g. `&PARM(parameter_0_weight)`, this will get run as part of the perl code evaluation.

If you set a course level parameter (see **Setting Parameters** (11)), you can access this parameter in the spreadsheet. To access the parameter 'testparm' use `&EXT('course.testparm')` in a cell of your spreadsheet.

18.4.4 Special Functions

The following special functions are available in the spreadsheet. Please see Referencing Cells (18.4.2) for information on specifying cells and ranges.

- `&NUM(range)` - number of non-empty cells in range
- `&BIN(low, high, range)` - number of non-empty cells in range with values between low and high
- `&SUM(range)` - sum of the non-empty cells in range
- `&MEAN(range)` - mean value of non-empty cells in range
- `&STDDEV(range)` - standard deviation of non-empty cells in range
- `&PROD(range)` - product of non-empty cells in range
- `&MAX(range)` - maximum value of non-empty cell in range
- `&MIN(range)` - minimum value of non-empty cells in range
- `&SUMMAX(n ,range)` - sum of the maximum n non-empty cells in range
- `&SUMMIN(n, range)` - sum of the minimum n non-empty cells in range
- `&EXT(expression)` - access to EXT function in lonnet. Use `&EXT('system.time')` to retrieve the current time.
- `&PARM(parameter)` - get the value of a specific parameter
- `&MINPARM(expression)` - get the value of a parameter that matches the expression that is the smallest in value (If one specified 'opendate' it would return the smallest opendate set on the problem.)
- `&MAXPARM(expression)` - get the value of a parameter that matches the expression that is the largest in value (If one specified 'opendate' it would return the largest opendate set on the problem.)
- `&SUMSEQ(column,sequence1,sequence2,sequence3,...)` - sum the given column across the folders or sequences listed.

  When specifying a sequence use the full title. Instead of a sequence title the word `all` can be used to sum over all sequences. Regular expressions can be entered as well, if prefixed by `regexp:`. See below for examples.

  - `&SUMSEQ('Z','Chapter 1');`
  - `&SUMSEQ('Z','Chapter 1','Chapter 2','Chapter 3');`
  - `&SUMSEQ('Z','all');` - sum over all sequences.
  - `&SUMSEQ('Z','regexp:Large Biomolecules');` - sum over all sequences which match the regular expression /Large Biomolecules/.

In addition, most non-IO Perl functions work in cells.

18.4.5 Examples and Comments

Summing up columns

To take the sum of column M, for example, use `&SUM('M*')`

Spreadsheet Lists

When you have a list of numbers in a cell, how it is displayed depends on how you separate the numbers and how Perl interprets the results.

`35 45 12` will not generate any result because this is an invalid Perl statement.

`35,45,12` will have a result of 12 because Perl has a comma operator similar to the comma operator in C.

The comma operator is binary and returns the value on its right. Thus `$variable = 15, 26;` assigns `$variable` the value 26. If you need the values to all be displayed as a string, enclose the entire cell contents in quote marks.

18.4.6 Examples and Comments on Assessment Spreadsheets

How to deal with multi-part problems

Often, there are several parts in a specific problem. For example, a problem with three parts may have parts 0, 11, 12, and 13, where part 0, is the part ID reserved for the problem as a whole. For a general spreadsheet, it is often desirable to sum up all of these parts, while not knowing how many parts there are as the spreadsheet is written.

The spreadsheet has a preprocessor which can expand a symbolic expression over all symbolic names that match. The general syntax is `[&EXPANDSUM(VARNAME;expression)]`. For example, for the above assessment with three parts,

```
&EXPANDSUM(PART;parameter_PART_weight*stores_PART_awarded)
```

would become

```
parameter_0_weight*stores_0_awarded +
parameter_11_weight*stores_11_awarded +
parameter_12_weight*stores_12_awarded +
parameter_13_weight*stores_13_awarded +
```

where **bolded text** is used to highlight (PDF version of manual excluded) what the `&EXPANDSUM` function is doing.

What 'tries' means

In multi-part questions, the exported value for "tries" is the average number of tries to get the parts correct. The full data for each part is still stored by the system. To assign partial credit based on number of tries, see the example in **Special Functions** (18.4.4).

18.4.7 Configuring Grade Categories

The spreadsheet can be configured with reasonable ease to accommodate grade categories. The strategy involves configuring assessment level spreadsheets for each category, configuring the student level spreadsheet to assign the activities to categories and calculate the overall

grade, and configuring the course spreadsheet to calculate overall category averages, etc.

Configuring the Assessment Level Spreadsheets

Because columns N-V are not used in the default assessment spreadsheet, pairs of columns from within that set can be customized for each category to replicate the 'Available Points' (by default in column X) and 'Awarded Points' (by default in column Z). For example, columns N and O can replicate these columns for a homework category, whereas columns P and Q can replicate these columns for a quiz category, etc. The appropriate columns can be summed on the student level spreadsheet.

To create a homework category assessment spreadsheet with this strategy, navigate within the spreadsheet interface to any assessment. Modify the formula in `N0` to be `Z0` (no quotes) for awarded points, and `O0` to be `X0` (no quotes) for possible points and then save the spreadsheet with a name such as homework_assesscalc. See **Spreadsheet Editing** (18.4). Repeat the procedure for each grade category, using different pairs of columns for each category and a different assessment spreadsheet name for each category.

Assigning the Assessment Level Spreadsheets and Calculating Student Grades

The assessment level spreadsheets are assigned to specific assessments at the student level spreadsheet. Navigate to the student level sheet, and browse to find an assessment that you wish to assign to an assessment category. In the assessment row, find in the third column a dropdown titled 'Assessment.' Select the desired assessment category that was created above. The formulas from the assessment spreadsheet will be automatically applied to that row.

Notice also on the student spreadsheet, under each folder title is a dropdown that provides an option to set the default assessment spreadsheet for the entire folder. This will apply the selected spreadsheet to all existing assessments, as well as any new assessments added to the folder in the future.

Next, edit row 0 to program the summations for the pairs of columns for each grade category. Remember that row 0 columns A-Z and a-z will be available for student viewing, so add appropriate text labels such that the calculations are clear to the students. Remember that the cells are much more powerful that traditional spreadsheets, and the cells can contain multiple lines of Perl script. For example, to calculate homework scores and drop a certain number of points, if columns N and O contain the awarded and available points respectively, each column can be totaled using `&SUM('N*')` and `&SUM('O*')` as well as logic statements and algebraic statements to apply the calculations. Note below how the script for homework score in column d gives students 50 'grace' points, but also adjusts for a maximum of 100%. The quiz calculations in column h avoid an error of division by zero if no quiz scores are present.

```
<field col=a row=0>
'(b)Raw Homework Points:
(c)Raw Homework Possible:
(d)Scaled Homework Percentage:'
</field>
<field col=b row=0>&SUM('N*')</field>
```

```
<field col=c row=0>&SUM(‘O*’)</field>
<field col=d row=0>
$possible = c0;
if($possible > 50) {
  $possible=c0-50;
}
$possible > 0 ? ($percent=b0/$possible*100) : ($percent=0);
$percent >= 100 ? 100 : $percent;
</field>
<field col=e row=0>
‘(f)Raw Quiz Points:
(g)Raw Quiz Possible:
(h)Quiz Percentage:’</field>
<field col=f row=0>&SUM(‘P*’)</field>
<field col=g row=0>&SUM(‘Q*’)</field>
<field col=h row=0>
g0 > 0 ? (f0/g0*100) : 0;
</field>
```

Columns A-Z should contain the totals for each category and the calculated grade because only these columns will be exported to the course level sheet.

Before you leave the student spreadsheet, **be sure to save the spreadsheet or you will loose all your customized work!** See **Modifying the Spreadsheet** (18.4). You will want to save this spreadsheet as the default to apply the spreadsheet to all students.

After the default student spreadsheet has been created, when new assessment items are added to the course, they may be assigned to existing assessment spreadsheets by using the assessment selector dropdown menu in the third colum, and the default student spreadsheet can be resaved.

Course Level Spreadsheet

After the student level sheet is created, the customized student columns A-Z will appear on the course level sheet. For that sheet, row 0 of the course level spreadsheet can be modified to perform any statistics that you would like to see as the instructor. For example, the row can be programmed to calculate the mean and standard deviation for a category. **Be sure to save any customized work as the default unless you need multiple course spreadsheets.**

19 Portfolio

The portfolio allows you to store and retrieve files on the LON-CAPA server. There are two main purposes of using a portfolio: (a) to upload documents that could then be submitted in response to an essay/drop box/task, and (b) to upload documents. Files stored in your portfolio can only be acessed by you, unless you set access ontrols for them which allow other users to view them (See: Sharing File 19.6). By storing files in the portfolio space of LON-CAPA you can access these files from any computer with an internet/web connection.

By default every user on the LON-CAPA system has a quota of 20 MB of portfolio space. Each file you add reduces your quota. However, portfolio submitted files can be modified by the grader and then uploaded back to the student, this will apear as a new 'version' of the file for the student but does not count against their quota.

There is also a group portfolio with a quota that is set by the group creator (typically a course coordinator). Group portfolios have the same functionalities as student portfolio. The main difference being that a number of people have access to group portfolios. It may be the case that some group members have different access to other group members. Once again, this is controlled by the group creator.

Your portfolio works much like file storage on your computer. You may create directories and subdirectories to organize your files (See: Creating Directory 19.1). After creating a directory, you must enter the directory (See: Changing Directory 19.2) and upload your file (See: Adding Files 19.4) to the current directory.

To retrieve a file, find the directory that contains the file then click on the filename (See: Opening File 19.5.1). The file will be downloaded to your computer.

You may share your files by changing the file permissions. You can also find/read other people's shared files by going to the other person's personal information page.

Also see: **Deleting File** (19.5.2), **Renaming File** (19.5.3), **File Catalogs** (19.5.4) and **The file list** (19.3).

19.1 Creating Portfolio Directories

You can organize the portfolio by using directories and subdirectories. To create a subdirectory make sure that you are in the correct directory first of all (See Changing Directory 19.2). The current directory you are in is shown above the list of files. It is a link having the text "portfolio/".

Once you are in the correct directory:

1. Write the name of the new subdirectory in the input box with the label "Create subdirectory in current directory:".
2. Press **create subdirectory**
3. A new subdirectory is created. If the name you submit has illegal characters (such as spaces), the illegal characters will be replaced by the underline character '_'.
4. Press done

Creating a subdirectory does not put you inside the directory. If you wish to enter the directory you must click the directory name you have just created.

19.2 Changing Current Portfolio Directories

The current directory you are in is shown before the file list. The complete path to the directory is also shown, starting with the root directory "Portfolio/". You can click on any of the directories shown on the path to move up the directory tree. If you need to enter a subdirectory, click on the subdirectory name on your file list.

19.3 The File Listing Interface

The file list shows all files and sub-directories contained within this directory. Clicking on a file will open or download that file. Clicking on a directory will take you to that directory.

The file list also has various action icons. The meaning of each of these icons are:

- folder image: This denotes that the name correspond to a directory.
- locked: If you have submitted a file for a problem, you cannot delete or rename this file
- checkbox: Check this box and press the **Delete** button to delete a files
- Rename: Click this button to rename files (See Renaming File 19.5.3).
- Cat: Click this button to create a catalog entry for this file (See File Catalogs 19.5.4)

19.4 Uploading Files to Portfolio

To add files first make sure that you are in the correct directory (See: Creating Directory 19.1, Changing Directory 19.2). The current directory you are in is shown above the list of files. The current directory indicator is a link starting with the text "portfolio".

Once you are in the correct directory :

1. Press on **Browse** to find the file from your local filesystem that you wish to upload to the portfolio space. You can only upload files, you cannot upload whole folders.
2. Press **Upload**.
3. When the file is uploaded (it may take a while if the file is large) a screen will confirm that the upload has succeeded. A link is available to take you back to the portfolio screen.

19.5 File Actions

There are a number of actions that can be performed to each file. You can rename files (19.5.3), add catalog information (19.5.4), or delete file (19.5.2).

19.5.1 Opening Files in Portfolio

To open a file, click on the filename on the file list. If you cannot see your file, you may be in the wrong directory, try changing directories (See Changing Directory 19.2).

19.5.2 Deleting Files from Portfolio

The portfolio allows you to delete some files. Locked files (files that have been handed in as solutions to a problem) cannot be deleted.

Subdirectories can only be deleted if they are empty. Enter the directory (See: Changing Directory 19.2), delete the files if necessary (see below) and click **Delete Directory** to delete the current directory.

To delete one or more files:

1. Check on the checkboxes next to the filenames you wish to delete.
2. Once all files in the directory are checked press on the **delete checked files** button.
3. A confirmation screen will appear. Make sure that the filenames are correct. Press **Continue** to delete the file, and **Cancel** to cancel the deletion of the file.

File deletion cannot be undone.

19.5.3 Renaming Files in Portfolio

You can only rename unlocked files. Click on the rename link on the file you wish to rename. The screen will change to a screen with an input box. Type in the new filename in the input box (be sure to write the extension. The extension is information used by the operating system on how to open the file). Press **continue** if you wish to rename the file. If you do not want to change the filename, press **Cancel**.

Invalid characters will be replaced by the character '_'.

19.5.4 Creating File Catalog

The catalog information allows you to enter additional information about a document that has been uploaded. The information can be used to categorize the document to be used for searching.

To create or edit catalog information, press the **Cat** button next to the rename link in the file list. The first page will ask you to associate the file to a particular course. You can also choose not to associate the file to any course. Once a course is chosen press the **Associate Resource with Selected Course** button.

The next page allows you to enter the various information. These information are:

- Author. The creators of the resource
- Title. The title of the resource
- Subject. The subject that the resource deals with
- Keyword(s). Keywords related to the resource for quick search/cataloguing
- Abstract
- Notes

- Lowest Grades Level. The lowest school grade of the reader this resource is suited for.
- Highest Grades Level. The highest school grade of the reader this resource is suited for.
- Standards

Click on **Store Catalog Information** to save the information created. Or press on **Discard Edits and Return to Portfolio** to cancel all edits.

19.6 Sharing Files in Portfolio

You can allow other people to see/download your file. This is done by setting the access status of the various file. The access status of the file can be changed for both locked and unlocked files. There are 3 different status

- Public access: Anyone can see/download your file via lon-capa
- Private access: Only you can see/download your file
- Password protected access: To see/download your file, a person must enter the password that you have set.

To change the status of a file, click on the view/change status link after the filename.

19.6.1 Setting Public/Password Protected Access

You can set the public/password protected access by:

1. Set the starting date and the ending date of when your file is to be publicly accessible. The ending date must be after the starting date.
2. If you wish to have the file public/password protected forever, click on **no end date**.
3. For password protected access, you must provide a password. You can then give the password to anyone who you wish to share your files with.
4. Click on the activate check box.
5. Press **Proceed** to make your files publicly/password protected available.

The URL where this file can be accessed will be given to you. Copy this URL and give the URL to people you wish to share your files with.

19.6.2 Change Access Setting

Changing share settings If you have previously set a file to be publicly accessible and you wish to change the settings:

1. Change the beginning/end date of the file
2. Check on update checkbox
3. press **Proceed** to update your settings

19.6.3 Removing Public/Password Protected Access

If you no longer wish to set a file to be publicly accessible/password protected (return it to private access):

1. Check on the delete checkbox
2. Press **Proceed** to update your settings

19.6.4 Conditional Access

You can also share files conditionally, that is only to a particular set of users. You can give access to all users of a particular domain, to users that are members of a course, or by specifying the usernames.

For each file, you can create multiple conditions. You can set access to a combination of more than one domain, course, or user.

To create conditions:

1. Click on the link Add conditional access / Change Conditions.
2. Add a condition (user based, domain based, or course based) by specifying the number of conditions to add.
3. Press **Proceed**.
4. Depending on what condition you choose, a screen will appear that allows you to set the parameters of the condition. There is an input field to specify the name of the domain/course/users that is/are allowed to access this file. Insert values for this parameter.
5. The process of setting, editing and stopping access is similar to setting the public/passphrase access (19.6.1).

20 Student Grade Access

Students can access grades using the **Grades** item in the inline menu, or via the **View current problem status and grading information** item in the Main Menu, which is displayed in place of the **View calculated grades (Spreadsheet)** item seen in a Course Coordinator's Main Menu.

A student's grades screen shows a summary of all of the student's scores. By default, the problem weight you assign to each resource is the problem score. However, if you changed your Course Environment's grading specification to "spreadsheet," your students will have access to their student spreadsheet with their scores based upon your spreadsheet via a detailed score sheet link. The use of the term "score" is also changed to the phrase "parts done" on the student **Points Display** screen. There are three different ways the **Points Display** screen can appear based upon the course configuration; see the"Grading" section)6.7).

20.1 Changing Course Environment for Student Access to Spreadsheet

Click **Modify course configuration** on the Main Menu. On the **Course Configuration** screen check **Grading** and hit Display Edit the course parameter variable **Grading**. This variable can take three values:

`standard`: the points for every problem part are partial credit factor times weight

- no detailed score sheet link provided to students on the **Points Display** screen page
- the **Points Display** screen page uses the word "points"

`external`: grading information screens are hidden, usually because grades are calculated external to LON-CAPA

- no detailed score sheet link is provided to students on the **Points Display** screen page
- the **Points Display** screen page does not use the word "points," but rather shows the number of completed parts

`spreadsheet`: the full spreadsheet is used for grade calculations

- the detailed score sheet link is provided on the **Points Display** screen page
- the **Points Display** screen page does not use the word "points," but rather shows the number of completed parts

21 Exams

There are multiple things here that you will need in order to run an exam.

1. You will need to be able to get a file from your scanning office that is a scan of the bubblesheets.

2. You will need to modify the scantronformat.tab file to properly describe what your data file looks like.

To see a homework problem set turned into a bubblesheet exam you need to set the parameter 'problemtype' for the set to 'exam' using the **Parameter Manager**, see section 11. The set of problems now should automatically convert to a "bubbled input" display, both online and when printing. You should be able to print out all of the exams now and there will be an individualized exam for each student.

When grading the exam you will need to

1. View any problem within the set

2. Click on **Content grades**

3. Click on **Grade/Manage/Review Bubblesheets**
4. You will then need to upload the bubblesheet data file to the LON-CAPA server
5. Once it is uploaded go back to the **Grade/Manage/Review Bubblesheet** screen
6. Fill in the **Specify file and which Folder/Sequence to grade** form

From there on out LON-CAPA tries to describe what is going on in detail so reading the screen and answering the questions should be straight forward.

We are also supporting anonymous mode of using bubblesheet exams.

Basically some people don't want to take the time to hand out 300 exams to individual students (e.g., to make sure Alice gets Alice's exam and Bob gets Bob's exam.) So we have another mode, where we generate different exam versions all of which have a 6-letter 'CODE' which control the random numbers. The generation and grading of these is a bit more complex.

1. Go to a resource in a course
2. Click **Print** in the Functions menu.
3. Select 'Selected Problems from <mapname> for CODEd assignments'
4. Specify formatting information for the printouts of your exam
5. Click Next
6. Type in the number of exams you want generated
7. If you want to save the CODEs for later so the bubbled input can be validated, type in a name to save them under
8. Click Next
9. Print them out
10. Fill in some bubblesheet forms
11. Get them scanned
12. Upload the scan results
13. Go to a resource in the exam
14. Click **Content grades** on the Inline Menu
15. Click on **Grade/Manage/Review Bubblesheets**
16. Select the map, datafile, bubblesheet format that knows where a CODE is on the form, and the name that CODEs where saved under

17. Click Grading: Validate Bubblesheet Records
18. Follow the on screen prompts

22 Slots

22.1 Using Slots

If you wish to restrict access to content in a course to particular IP address(es) and/or dates, one way to do that would be to use the "Client IP/Name Access Control" parameter to control access by IP address, and the parameters: Problem Opening Date/Problem Due Date (for problems), and Content Open Date/Content Close Date (for other types of content) to control access by date.

LON-CAPA also provides a separate mechanism to restrict access to assessment item(s), i.e., resource(s) with a file extension of .problem or .Task, which can be useful in the case where students will reserve access in advance to content at a particular time and/or place.

One example would be a laboratory which has limited seating, and which is offered multiple times over a given time period, but for which students should only be able to reserve access for one particular opportunity. To support that type of scenario, slots would be used.

Slots can also provide access control in which a proctor either directly, or remotely, must enter a pre-determined proctor username and passphrase to check-in a student into a slot. Prior to check-in, the proctor can validate that the student who will receive access to content protected by a slot is the actual owner of the username for whom access is being granted.

One example would be an online exam in a testing center, in which a proctor would type in the proctor username and passphrase into the proctor validation screen after verification of the student's official photo ID. Another example would be an online exam in which a remote proctor would temporarily take control of the user's keyboard and enter the proctor username and passphrase remotely into the user's web browser.

Lastly, slots can also be used as a reservation system, e.g., for office hours, where there is no need for a student to actually submit anything to the assessment item for which access is controlled by slots, but the time/date of the reservation itself made by a student to gain access is of value.

Course Coordinator View

There are two parts to the process of using slots to control access to assessment items.

1. An instructor will create the slot using the Slot Management utility
2. An instructor will assign use of slots to particular resource(s) in the course using the Parameter Manager to set the "Use slot based access controls" (useslots) parameter to one of the three "Yes" options.

The slot management utility can also be used to modify slot settings after a slot has been created. Slots can be created in two ways:

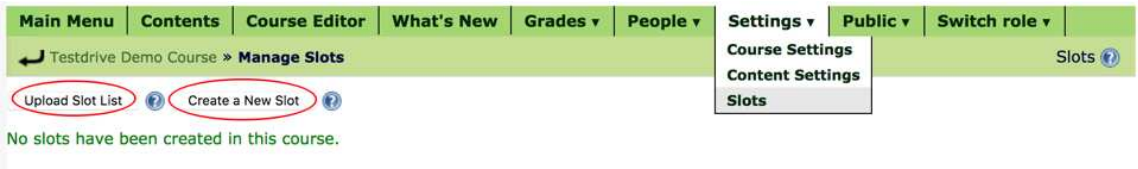


Figure 2: Slot Creation Buttons

Figure 3: Slot Management Utility

- Interactively, by using the multi-page slot "helper" web form which prompts for the choices to be made when configuring a slot.
- By creating a comma-separated-value (CSV) file containing slot attributes and uploading the file using the Slot Management utility, see "Uploading Slot Attributes File" section (22.2).

In both cases an instructor will use the multi-page slot "helper" web form should modifications be needed to the configuration of a slot after it has been created.

As Course Coordinator use Settings > Slots to access the Slot Management Utility.

Slots are of two types:

1. instructor-assigned
2. student-schedulable

In the case of an instructor-assigned slot, after a slot has been created, and the "Use slot based access controls" (useslots) parameter has been set to yes, the name of the slot needs to be included in the value set for the "Slots of availability" (available) parameter. That parameter can contain multiple : separated slot names, if multiple instructor-assigned opportunities are to be provided to students to access a particular resource or folder.

In the case of a student-schedulable slot, there is no need to set any parameter besides the "Use slot based access controls" (useslots) parameter.

Although a Course Coordinator can use either Settings > Content Settings > Edit Resource Parameters - Table Mode or Settings > Content Settings > Modify Resource Parameters - Overview Mode to display values set for specific users for "Slots of availability selected

Main Menu | Contents | Course Editor | What's New | Grades ▾ | People ▾ | Settings ▾ | Public ▾ | Switch role ▾

Testdrive Demo Course » Content and Problem Settings » **Table Mode** — Table Mode Parameter Setting

Change Parameter Selection

Assessment URL and Title	Type	Enclosing Map or Folder	Part	Parameter Name	Any User: in Course: general	Any User: in Course: for Enclosing Map or Folder	Any User: Resource Level: default	Any User: Resource Level: from Enclosing Map or Folder	Any User: in Course: for Resource	Parameter in Effect	Current Session Value
lib / templates / simpleproblem.problem **Lab 1 sign-up**	problem	Lab 1	0 (default)	Use slot based access controls [Part: 0] (useslots)					resource	resource	resource
			0 (default)	Slots of availability [Part: 0] (available)					lab1makeup	lab1makeup	lab1makeup

Figure 4: Parameter setting for instructor-assigned slot

Testdrive Demo Course » Content and Problem Settings » **Table Mode** — Table Mode Parameter Setting

Change Parameter Selection

Assessment URL and Title	Type	Enclosing Map or Folder	Part	Parameter Name	Any User: in Course: general	Any User: in Course: for Enclosing Map or Folder	Any User: Resource Level: default	Any User: Resource Level: from Enclosing Map or Folder	Any User: in Course: for Resource	Parameter in Effect	Current Session Value
lib / templates / simpleproblem.problem **Lab 1 sign-up**	problem	Lab 1	0 (default)	Problem Opening Date [Part: 0] (opendate)		Sun Jan 10 12:00:00 am 2021 (EST)				Sun Jan 10 12:00:00 am 2021 (EST)	Sun Jan 10 12:00:00 am 2021 (EST)
			0 (default)	Problem Due Date [Part: 0] (duedate)		Sun Jan 10 05:00:00 pm 2021 (EST)				Sun Jan 10 05:00:00 pm 2021 (EST)	Sun Jan 10 05:00:00 pm 2021 (EST)
			0 (default)	Use slot based access controls [Part: 0] (useslots)					resource	resource	resource
			0 (default)	Slots of availability [Part: 0] (available)							
			0 (default)	Slots of availability selected by student [Part: 0] (availablestudent)							

Figure 5: Parameter setting for student-schedulable slot

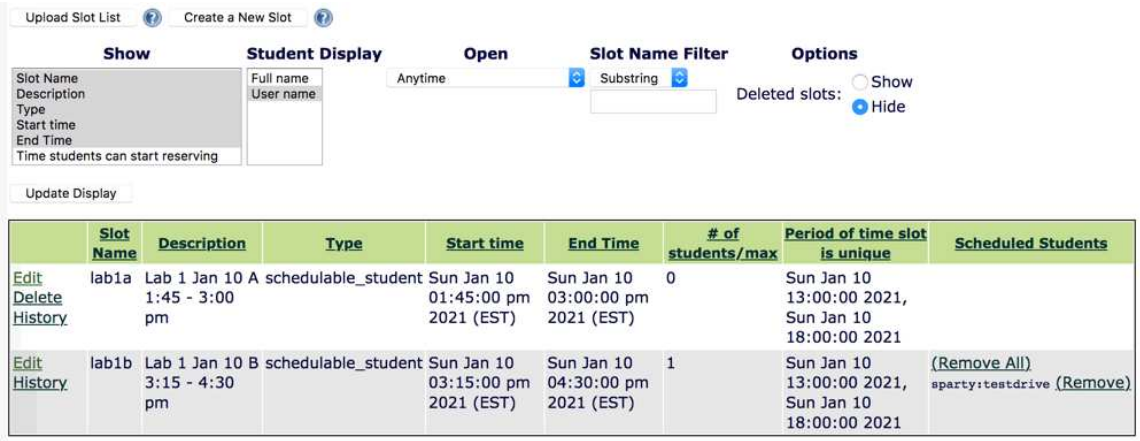


Figure 6: Reservation listing for student-schedulable slots

by student" (availablestudent), the preferred method is to use the Slot Management Utility. The utility provides the ability to view a list of students who have reserved a slot, and also to remove some or all of the reservations, as needed.

For student-schedulable slots, each slot includes a History link below the Edit link in the leftmost column of the table of slots. The History link provides access to information about reservations changes for the slot, including who made the change, and in what context.

The expectation for student-schedulable slots is that each student will use the 'Reservations' item included in the inline menu in a course with one or more such slots, in order to add, change or drop reservations for resources which are using them.

In the case of a student-schedulable slot, the slot will only be selectable by the student for use for any resources which require a slot (i.e., for which the value in effect for the useslots parameter is yes), if all of the following are true:

- The resource is open, i.e., between open date and due date (if set).
- The slot start date is in the future.
- Any conditions on slot use based on resource, and/or section, and/or specific users are met.

Further constraints on whether a particular student-schedulable slot will be selectable by a student are available by setting one or more of:

1. Period of time when this slot can only be uniquely chosen
2. Time students can start reserving
3. Time students can no longer reserve
4. Maximum number of students allowed in this slot

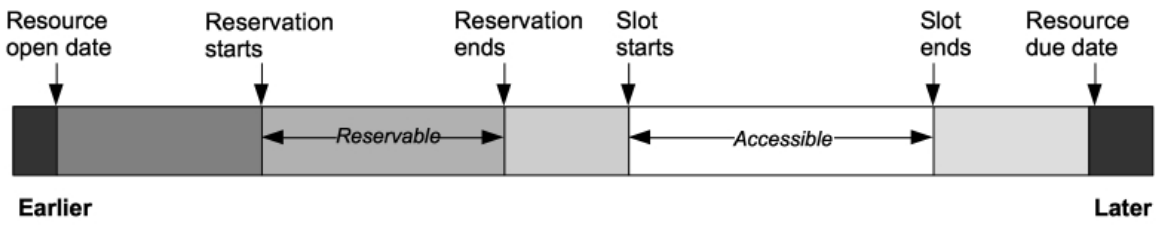


Figure 7: Reservability and Accessibility Timeline

Note: a slot may not be reserved by a student after the open date/time of the slot.

If there are multiple items in a course for which "useslots" is set to yes, a student may make multiple reservations with a single slot, if resource-use restrictions on the slot permit it.

If there are multiple student-schedulable slots available in a course, with start times in the future, more than one slot may be reserved by a particular student for a particular resource, if uniqueness and/or resource use restrictions permit it.

Furthermore, both instructor-assigned slot(s) and student-schedulable slot(s) can be in effect for a particular student for a particular resource.

On the student's side, information about items in course for which access is restricted by slot is available from any of the following:

- The "Manage Reservations" utility accessed via the "Reservations" item in the inline menu.
- Status information for each resource in the Course Contents listing.
- Attempted display of the resource itself in the course.

In all three cases, if one or more slots have already been selected to apply to a particular student when accessing that resource, and the end date/time has not yet been reached, the description of the (selected) slot with the earliest (future) opening date/time will be displayed alongside the resource name in the contents listing, or below the message: "Access requires reservation to work at specific time/place", when displaying the resource.

Prior to the start date/time both the "Manage Reservations" utility, reached via "Reservations" in the inline menu and the URL for the resource itself, will provide buttons to Change or Drop an existing reservation, or to Select another reservation.

When a student displays a resource for which a pre-assigned or selected slot is now open, i.e., the start date/time of the slot is in the past, and the end date/time is in the future, and any IP-based restrictions included for the slot are satisfied for the student's current IP address, than either the resource will be displayed, or a Proctor validation screen will be displayed in the case where check-in by a proctor has not yet occurred for a slot which needs it.

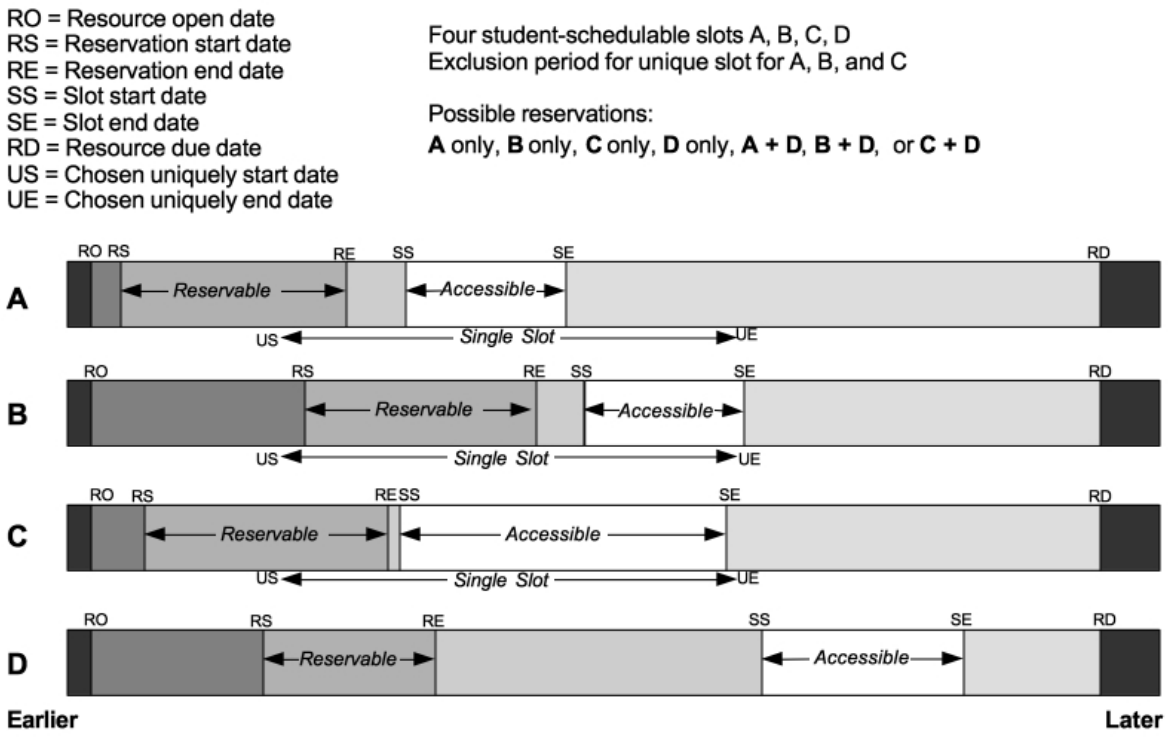


Figure 8: Uniqueness constraints for multiple slots

Figure 9: Proctor validation screen

If the useslots parameter for a resource is set to yes, and it has a slot scope which applies to the enclosing map/folder, then there are two additional possibilites: either check-in only applies to the resource itself, or check-in for a resource automatically propagates the checked-in status to other resources in the same map/folder.

Once checked-in, the resource itself will be displayed, and the countdown icon above the resource will countdown to the earliest of the following:

- the due date/time
- the slot end date/time,
- the time-limit, for a resource or folder in which the interval (time-limit) parameter is in use (after the "Show Resource" button has been pushed to start the timer).

Once the slot end date/time is reached for the checked-in slot currently in effect for access to the resource, if there are additional slot(s) which may be used to satisfy the "useslots" requirement for access, those slot(s) will then come into play.

If there is a student-schedulable slot, which is reservable (i.e., both the slot start time and end reservation time are in the future, and if a cap on number of students, if set, has not been reached), then a student can reserve the slot in order to resume access to the resource after the slot start time (which could require new proctor validation).

Conversely, if the student already has a reservation for this second slot for this particular resource, then assuming IP-based restrictions are met, the student will either be shown a proctor validation screen if the slot uses a proctor, or if not, will be checked-in automatically when displaying the resource.

Student View

Figure 10: Contents Listing with Reservation Status

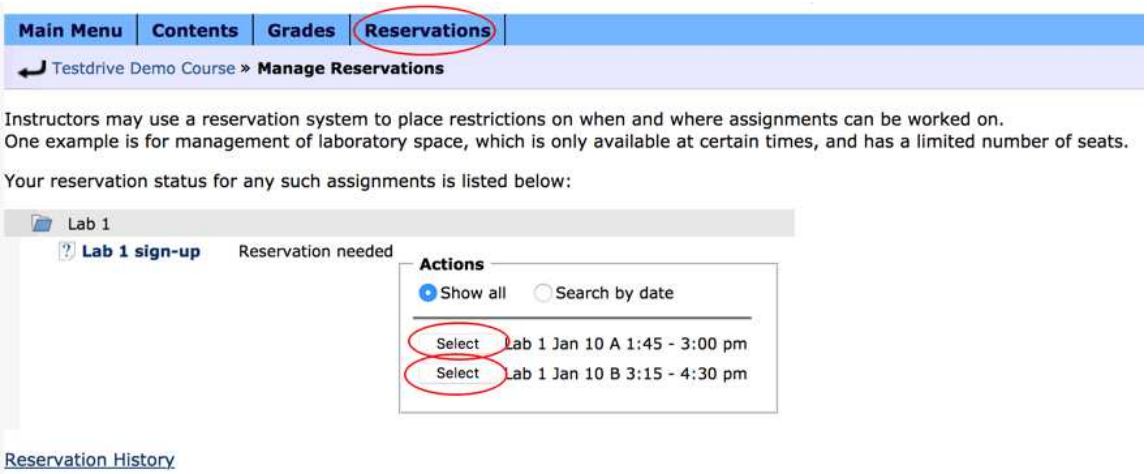


Figure 11: Interface for Initial Reservation

In the case where an open resource has slot-based access, the Course Contents listing will include information about the current reservation status.

The expectation for student-schedulable slots is that each student will use the 'Reservations' item included in the inline menu in a course with one or more such slots, in order to add change or drop reservations for resources in a course which use them.

If there is no 'uniquely-chosen' restriction in force, then Select button(s) will be available for additional slots after making a reservation. If, however, slots can only be selected one at a time then the other Select button(s) will become 'Change reservation' button(s) after a reservation has been made. If a student wants to display just a single resource for which student-schedulable slots are available then if the resource itself is accessed before the slot start time the same 'Select' button(s) will be shown for applicable slot(s).

If the 'Change Reservation' button is pushed then a confirmation page will be displayed which includes a 'Process the change' button to push to complete the switch of reservation (with 'uniquely-chosen' restriction) from one slot to another.

Once the slot start time is reached, when a student accesses the particular assignment either the resource will be displayed immediately (assuming any location-based conditions

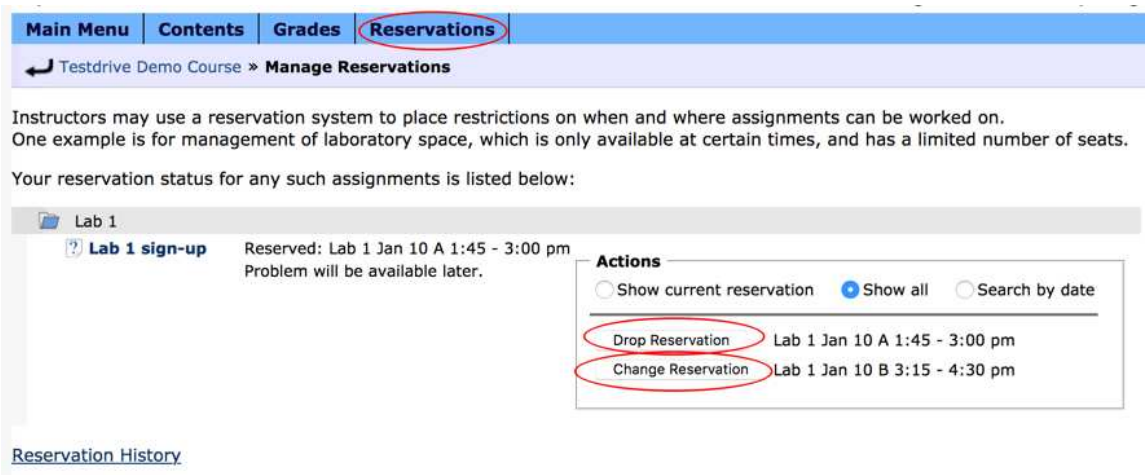


Figure 12: Interface for Additional Reservation

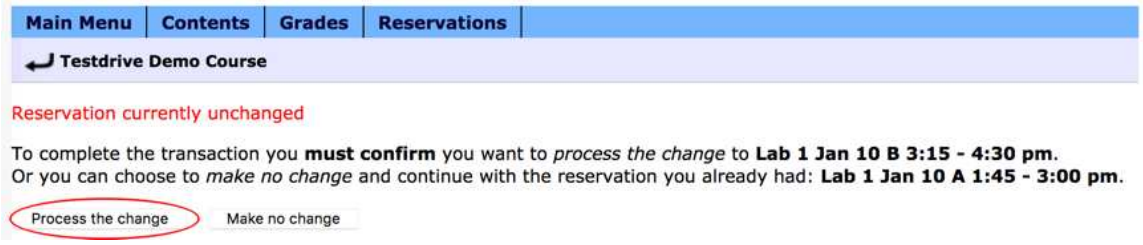


Figure 13: Reservation switch confirmation

are met), or if proctor validation is required, a web form will be displayed which requires entry of the proctor's username and the secret word used for check-in, as set in the particular slot's configuration.

22.2 Uploading Slot Attributes File

If you will be creating several slots you may prefer to create them by uploading a comma separated value (CSV) file containing slot configuration information with one line of data per slot. An easy way to create this type of file is to use a spreadsheet application such as Microsoft Excel, and save the file as a Text (CSV) file. If you use a text editor directly to create the file, you should use double quotes around any values which themselves contain a comma (e.g., list of proctor ids).

To upload a file press the **Upload Slot List** button on top of the page. On the first page, select the file with the slot data to upload by pressing the **Browse button**. There is an option to ignore the first line. This is useful when the first line of your comma delimited file consists of headers for each field. You can also upload space and tab delimited file by changing the type combo box. Press **Upload** to upload the file.

Once uploaded, you will be prompted to identify the contents of each column in your CSV data. The following fields are supported:

- Slot name
- Type of slot
- Start Time of slot
- End Time of slot
- Reservation Start Time
- Reservation End Time
- Message when reservation changed
- IP or DNS restriction
- List of proctor ids
- Slot Description
- Maximum number of reservations
- Resource Restriction
- Date range of slot exclusion
- Secret word proctor uses to validate
- Sections slot is restricted to

- Users slot is restricted to

The following fields: "Slot name", "Type of slot", "Start Time of slot" and "End Time of slot" are required.

Format restrictions for the required fields are as follows:

- A Slot name may only contain letters, numbers and underscores.
- The Type of slot must be either preassigned or schedulable_student.
- The four Time fields: Start Time, End Time, Reservation Start Time, Reservation End Time permit a variety of formats (for example: YYYYMMDDHHMMSS and MM/DD/YYYY HH:MM:SS)

End Time must be later than Start time. If no Reservation Start Time is specified, the slot can be reserved after the open date. If no Reservation End Time is specified, the slot can be reserved up until the slot start time.

Format requirements for the optional fields are as follows:

- "Message when reservation changed" can be: only_student, student_and_user_notes_screen or none.
- "IP or DNS restriction" is a comma-separated list. If a particular IP restriction is: deny access from, prepend ! to the item. Individual IP/DNS items can have one of the following formats:
  1. a range, e.g, 35.8.3.[34-56]
  2. partial IP with wildcard, e.g., 35.8.*
  3. domain or subnet: e.g., *.msu.edu
  4. single IP: e.g., 127.0.0.1
  5. single DNS name, e.g., some.name.com
- "Unique IP each student" can be yes
- "List of proctor ids" is a comma separated list of username:domain for users who will proctor.
- "Maximum number of reservations" is a positive integer
- "Resource Restriction" is the unique resource identifier (also known as a 'symb'). A list of unique identifiers in a course is available from: Course Editor > Content Utilities > List Resource Identifiers.

- "Date range of slot exclusion" contains two dates separated by a comma. The second date/time must post-date the first date/time. Permitted formats for each date/time are the same as for the four time fields.
- "Sections slot is restricted to" is a comma separated list of course sections
- "Users slot is restricted to" is a comma separated list of users (each user is in the format username:domain)

23 Clickers

23.1 Using Clickers

It is possible to incorporate the use of clickers into a LON-CAPA course. Students must register their clicker IDs in the Preferences (see 23.2) in order to incorporate clicker data into the course. Instructors can upload scores to a problem using the clicker ID information provided by the students. Follow the steps below to upload clicker data to count as credit in your LON-CAPA course.

1. Optionally register your own clicker in your Preferences (see 23.2).
2. Add a Score Upload Form to your course from the Course Editor, see 7.6.3. You can have multiple clicker questions in one lecture, but only one Score Upload Form for each lecture.
3. Display your clicker questions in class. Example, use PowerPoint.
4. Have students use the clicker to answer the questions. Optionally answer the question correctly with your own clicker.

   If you use your own clicker to answer the questions, you can later use that data to have the "correct answers determined by instructor(s)"
5. Take the clicker datafile and upload it to LON-CAPA:
   (a) Navigate to the Score Upload Form
   (b) Click the Problem Grades menu item
   (c) Choose the option to process clicker
   (d) Browse and Upload the clicker files
   (e) Choose the clicker brand (example, i>clicker)
   (f) Choose the appropriate option to award points
      - Award points just for participation
      - Correctness determined from response by course personnel (This option assumes you registered your own clicker and answered the question.)

Figure 14: Location of Label on i>clickers

- Correctness determined from response with clicker ID(s) (If you answered the question with an unregistered clicker, enter that clicker's ID here.)
- Correctness determined from given list of answers (If you didn't answer the question with a clicker, define correct answer here.)

(g) Define what percentage of the question weight students get for getting the question correct or incorrect. Your data file may have multiple questions. Say, you award 70% for incorrect and 100% for correct, and the student has three wrong and two correct answers, you get (3*70%+2*100%)/5=82%. The student is then awarded 82% of the weight of the Score Upload form.

(h) Upload file. There may be correction steps you need to go through letting you choose users for unregistered clickers, etc.. You will need to deal with these steps to finalize the upload and scoring.

23.2 Registration of Clickers

LON-CAPA users can register their clickers within LON-CAPA. To register your clicker, do the following:

1. Either select **Preferences** from the dropdown list displayed when you mouseover your name at the top left of the screen or click **Main Menu** on the Inline Menu and then select **Set user preferences** in the **My Space** group
2. At the **Set User Preferences** screen, select **Register Response Devices ("Clickers")**.
3. Type your clicker ID in the text box. Below are instructions on how to find your clicker ID for various clicker models.
4. Click the Save button.

i>clicker: on i>clicker devices, the clicker ID is located on a sticker on the back.

Turning Technology: on Turning Technology devices, the clicker ID is located on a sticker on the back.

Interwrite RF: on the RF version of the Interwrite clicker, you need to go through a number of steps. When you first switch it on, it will look for a class. Cancel that by pressing the asterisk key.

Figure 15: Location of Label on Turning Technology clickers

Figure 16: Interwrite Step 1

Figure 17: Interwrite Step 2

Figure 18: Interwrite Step 3

Next, enter the menu by pressing the Left key.
Scroll, using the Down key, to the entry Diagnostics.
Press the Enter key to enter Diagnostics.
The clicker ID is listed.
Interwrite IR: the clicker ID (6 digits) is located on a sticker on the back of the device.
Interwrite Virtual: The clicker ID is the Media Access Control address ("MAC address") of your network card. MAC addresses look like this
`01-23-45-67-89-ab`
or like this
`01:23:45:67:89:ab`
How to locate this depends on your operating system.
Windows Vista

- Click the Start Button and select Start Search.
- Type `cmd` in the blank box. Hit Enter.
- In the command prompt window, type `ipconfig /all`
- Locate the number that goes with the adapter you would use in the lecture hall.

Figure 19: Interwrite Step 4

Figure 20: Interwrite Step 5

Windows NT / 2000 or XP

- After clicking on the Start Button, click on Run.
- Type *command* in the blank box. Click on OK.
- Once a small black window appears, type in `winipcfg`
- Locate the number to the right of "Physical Address."

Windows 95/98/ME

- After clicking on the Start Button, click on Run.
- Type in `winipcfg` in the blank box. Click on "OK."
- Look under the info for the Ethernet adapter you would use in the lecture hall.
- Locate the number next to "Adapter Address."

Macintosh (OS X)

- Under the Apple menu, select "System Preferences".
- Select the "Network" Pane.
- Doubleclick on the adapter you are using, for example "Airport" or "Built-in Ethernet" (use the adapter you would use in the lecture hall).
- Click on the "Airport" or "Ethernet" tab, respectively - the number is displayed.

Linux Type `/sbin/ifconfig -a` and look up the relevant info. For example:

```
[root@foo bar]# /sbin/ifconfig -a
eth0 Link encap:Ethernet HWaddr 01:23:45:67:89:AB
...
```

The number is the HWaddr.

24 Printing

24.1 Prepare a Printable PDF Document

To print a resource, do the following:

1. The icon will only be accessible when you are looking at one of your resources for your course.
2. Click to access the Print Helper, which will help you create a PDF document.

The Print helper will guide you through the process of preparing a PDF document of the resource. If you see error message when trying to prepare a PDF file, then you will need to contact the author of the problem which contains that printing error.

Printing involves a translation of your XML file into LaTeX and from there to PDF. Some of the XML tags have a set of special print options, see 24.2. Sometimes translations require special considerations, see 24.3.

24.2 Tips for Improving Print Output

Here you can find some useful tips how to make your printing output looking prettier.

Print output oriented attributes of standard HTML/LON CAPA tags

- 24.2.1 `<h1>-<hN>` **TeXsize** attribute
- 24.2.1 `<basefont>` **TeXsize** attribute
- 24.2.1 `<font>` **TeXsize** attribute
- 24.2.2 `<hr>` **TeXwidth** attribute
- 24.2.2 `<table>` **TeXwidth** attribute
- 24.2.3 `<table>` **TeXDropEmptyColumns** attribute
- 24.2.2 `<td>` **TeXwidth** attribute
- 24.2.2 `<th>` **TeXwidth** attribute
- 24.2.4 `<img>` **TeXwidth** attribute
- 24.2.4 `<img>` **TeXheight** attribute
- 24.2.4 `<img>` **TeXwrap** attribute This attribute controls how the generated LaTeX attempts to wrap text around figures when a horizontal alignment has been requested in the IMG tag. Unfortunately, LaTeXis not really built to do this and there are no known perfect solutions. This attribute has two possible values:
  - texwrap - (the default) uses the texwrap environment to attemp to get text to wrap around the picture. This requires either a "left" or "right" alignment, and works well in most cases.
  - parpic - uses the picins package `\parpic` to attempt to get text to wrap around the image. This method places the remainder of the text of the paragraph containing the picture to the left or right of the picture. This scheme has two drawbacks: If the remainder of the paragraph text is insufficient to fill the area to the side of the image, the text from the following paragraph will run through the image, parpic also seems to not do a good job of honoring the end of the page, and images can spill below the page footers generated by Lon-CAPA.

24.2.1 TeXsize Attribute

TeXsize attribute in `<h1>-<hN>`,`<basefont>`, and `<font>` tags declares the size of LaTeX fonts used in printing.

Possible values of **TeXsize** attribute:

tiny	smallest
scriptsize	very small
footnotesize	smaller
small	small
normalsize	normal
large	large
Large	larger
LARGE	even larger
huge	still larger
Huge	largest

Note, that all parameters coincide with standard LaTeX commands for changing font size though you do not escape them.

Examples:

```
<basefont size="4" TeXsize="Large" />
<font color="#FFFFFF" TeXsize="small">
<h1 align="center" TeXsize="Huge">
```

24.2.2 TeXwidth Attribute

TeXwidth attribute allows you to specify the width of

- the table in `<table>` tag
- the table cell in `<td>` or `<th>` tags
- the length of the line in `<hr>` tag

You can use the following units:

mm	
cm	=10 mm
in	=25.4 mm
pt	=0.35 mm
pc	=4.22 mm

Examples:

```
<hr TeXwidth="2 cm">
<td TeXwidth="1 in">
```

24.2.3 TeXDropEmptyColumns Attribute

TeXDropEmptyColumns attribute allows you to supress printing of empty columns in table. This option is useful when you have deal with big tables (very often nested) with a lot of empty columns. Situation is typical in chemistry where tables are used for visualization of chemical reactions.

Example:

```
<table TeXDropEmptyColumns="yes">
```

24.2.4 Image TeX Attributes

- Image Url contains the URL of the image to be inserted in the problem. You may enter a URL or click "Select" to choose an image that has already been uploaded to your authoring space, or click "Search"
- Description contains a textual description of the image. If the image cannot be rendered by the target browser, this description is displayed instead.
- width (pixel) allows you to set the width of the image, in pixels, as it will be displayed in a web browser.
- height (pixel) allows you to set the height of the image, in pixels, as it will be displayed in a web browser.
- TeXwidth (mm) Allows you to set the width of the image, in mm, as it will be rendered into the LaTeXdocument used to print the problem.
- TeXheight (mm) Allows you to set the height of the image, in mm, as it will be rendered intot he LaTeXdocument used to print the problem.
- TeXwrap Allows you to select how the LaTeXdocument will attempt to wrap text around a horizontally aligned image (See Alignment below).

  parbox `\newline` and `\parbox` will be used to place the image. This method ensures that text will not be wrapped on top of the image, however very little text will appear next to the image itself.

  parpic The picins package `\parpic` command will be used to place the image. This will wrap the remainder of the paragraph containing the picture around the image. If, however, there is insufficient text to fill the space to the left or right of the image, the next paragraph may be wrapped on top of the image. In addition, `\parpic` does not always honor the end of the page, causing the image to extend below the page footer.

- Alignment Specifies the alignment of the image relative to the enclosing text paragraph:

  bottom The image will be aligned so that its bottom will be at the baseline of the surrounding text.

middle The image will be aligned so that its center-line will be at the baseline of the surrounding text.

top The image will be aligned so that its top will be at the baseline of the surrounding text.

left The image will be placed so that it is at the left of the surrounding text. The surrounding text will fill in the region to the right of the image.

right The image will be placed so that it is at the right of the surrounding text. The surrounding text will fill in the region to the left of the image.

24.2.5 TeX Type Attribute

TeXtype attribute is responsible for the definition of the type of LaTeX list environment used during printing of available options. Possible values of this attribute:

TeXtype attribute is responsible for the definition of the type of LaTeX list environment used during printing of available options. Possible values of this attribute:

value	example of list
1	[1.] First Item [2.] Second Item [3.] Third Item
A	[A.] First Item [B.] Second Item [C.] Third Item
a	[a.] First Item [b.] Second Item [c.] Third Item
i	[i.] First Item [ii.] Second Item [iii.] Third Item

Examples:

```
<radiobuttonresponse TeXtype="1">
<radiobuttonresponse TeXtype="A">
```

24.2.6 TeX Itemgroup Width Attribute

TeXitemgroupwidth attribute allows you to specify the width of table with items for matching. The value of this attribute defines the width in percents with respect to text line width.

```
<matchresponse TeXitemgroupwidth="40%">
```

24.2.7 TeX Layout Attribute

TeXlayout attribute governs the way how available options are displayed when printed - either vertically (attribute value - "vertical") or horizontally (attribute value - "horizontal).

Examples:

```
<optionresponse TeXlayout="horizontal">
<optionresponse TeXlayout="vertical">
```

24.3 Troubleshooting PDF Errors

When you print a LON-CAPA resource, the XML of your resource is translated into LaTeX. The LaTeX is then processed and turned into a PDF document which can be displayed with your browser's Acrobat plugin and subsequently printed.

There are several problems that crop up both due to limitations in the XML to LaTeX translation and due to differences in the model used by web browsers to render HTML and LaTeX to compose print pages. This document provides information about some of these problems and, where possible, solutions, and tricks to work around them. If you have a printing trick or a problem and would like to report it, please go to http://bugs.lon-capa.org and register a bug report.

General information about printing within LonCAPA is also available in section 24.1. Some types of problems that may occur include:

The print rendition of some Perl functions looks ugly

In particular these functions are:

- &prettyprint
- &dollarformat
- &xmlparse
- &chemparse

To make these two functions work correctly within the print translator, it is necessary to wrap them within a <`display`> tag. For example:

```
<p>
If I had <display>&prettyprint(100,'$2f')</display>
</p>
```

Note that the `<display>` tags must be tightly wrapped around the function call or you will get a syntax error in web presentation mode. For additional information about cases where you must use `<display>`, see "Variables with tags don't print correctly" below.

Image placement and alignment and text wrapping is wrong

Unfortunately this is due to a large difference between the LaTeX and HTML page layout model. In HTML images are placed exactly where you ask them to be placed. In LaTeX,

images are considered *floats*, which LaTeX will place for you. Some of the common html tricks, using tables e.g. to control text wrapping around figures, will not always work in print mode; especially if the text is to the right side of the figure in the table.

The alignment choice affects whether or not the print rendering engine attempts to get text to wrap around the image. With `align="right"` or `align="left"`, the print rendering engine attempts to use the *wrapfigure* environment to place text around the figure at the appropriate side. If a figure is in a table, then the print engine, by default, the print engine will use wrapfigure, set the alignment to "right" unless you override it. Otherwise, the default alignment is "bottom" as it is for html, and no wrapping will occur.

`\parpic` style wrapping is also available by specifying `TeXwrap="parpic"` in the `<img>` tag. In some limited casese this gives a better result.

Other print specific `<img>` tag attributes are available (see section 24.2).

Variables with tags don't print correctly

If a variable contains XML, in general it is necessary to force the XML parser to make a pass over the contents of the contents of the variable prior to rendering the section of the resource that contains that substitution. When output, those variables must be bracketed inside of `<display> </display>` tags. For example:

```
<problem>
<script type="loncapa/perl">
$a = &xmlparse('<br />');
</script>
<startouttext />
<p>This is a break <display>$a</display> and then some more text</p>
<endouttext />
</problem>
```

Without the xmlparse call and the display tag bracketing the variable, this problem will display on the web just fine, but print incorrectly.

25 Miscellaneous

25.1 Adding Instructors and Teaching Assistants to Your Course

A course coordinator can add TAs, instructors, guests, etc., to the course. There is also the option to create a new role with customized privileges; see how to create a custom role in 25.1.3.

To add a user to your course:

1. Select **Manage course users** on the Main Menu.

2. On the **User Management** screen, select **Add/Modify a Course User**.

3. You can use the **Search for a user and modify/add user information or roles** section to search for a user by username, or last name, in a specific LON-CAPA domain, or in an institutional directory, if the domain has access to an institutional directory search service. You can also click the Select User link and a window will open with a list of all the users in the course.

   Note: If you know the exact username, you can either use a "username is ..." search in the search section, or type the username in the textbox in the **Enroll one student** section.

4. Click the Search or Enroll/Modify user button, as appropriate.

5. Scroll down to **Add Roles**.

6. Click the box next to the roles you wish to activate for the selected user.

7. Set the starting dates and ending dates for each role you selected, and optional section affiliation for instructors.

8. Click the Save button to complete the process.

25.1.1 Actions Available for Standard Course Roles

Actions available for each of the standard roles are marked with an X in the following table.

	Course Coordinator	**Instructor**	**Teaching Assistant**	**Exam Proctor**	**Student**
Browse resources in course	X	X	X	X	X
Grant/revoke role of Student	X				
Delete messages from discussion boards	X	X	X		
Disable all communication among students	X	X		X	
Create User Notes, Display all Users' Notes, Face-to-Face, Critical Messages, Broadcast Messages	X	X			
Evade communication blocking	X	X		X	
Generate anonymous statistics	X	X			
Lock and unlock assessments	X			X	
Edit course contents	X	X			
Modify grade queue	X	X			
Modify grades	X	X	X	X	
Grade items in grading queue	X	X	X	X	
Set assessment parameters	X	X			
Post anonymously	X	X	X		X

	Course Co-ordinator	**Instructor**	**Teaching Assistant**	**Exam Proctor**	**Student**
Advanced printing options (with answers, discussions, all foils, ...)	X	X		X	
Post discussion on course resources	X	X	X		X
Print for other users and entire course	X	X	X	X	
Post to live chatrooms	X	X	X		X
Get identity behind anonymous postings	X	X			
Send internal message	X	X	X	X	X
Send broadcast and receipt-required message	X	X			
View grades	X	X	X		
Access to What's New page	X	X	X		

In addition, system-wide privileges provided by each of the standard roles in a course are marked with an X in the following table:

	Course Co-ordinator	**Instructor**	**Teaching Assistant**	**Exam Proctor**	**Student**
Advanced Role in System	X	X		X	
Browse Resources in LON-CAPA shared library	X				

25.1.2 Change Privileges of a User

Course personnel with rights to create users in a course can add a user to a course or modify a user's privileges, as follows: (Note: if creation of new users is not permitted in your domain, you will only be able to add a user with an existing account in the LON-CAPA system).

1. Mouseover the **People** item in the inline menu and click **Users** or select **Manage course users** in the "User Management" box on the Main Menu page.

2. At the **User Management** screen, select **Add/Modify a Course User**.

3. You can use the **Search for a user and modify/add user information or roles** section to search for a user by username, or last name, in a specific LON-CAPA domain, or in an institutional directory, if the domain has access to an institutional directory search service. You can also click the Select User link and a window will open with a list of all the users in the course.

   Note: If you know the exact username, you can either use a "username is ..." search in the search section, or type the username in the textbox in the **Search criteria** section.

4. Click the **Search** or **Create/Modify user** button, as appropriate.

   Note: If the user exists, the **Modify existing user** screen will display the user's information, existing roles and roles you can assign. Which fields appear as textboxes in the **Personal Data** table, and may be modified, will depend on policies set for the domain.

   Note: If this will be a new user, the **Create New User** screen will display fields to type in the user's information, and roles you can assign.

5. Click the box next to the roles you wish to revoke, or add to the user. If you are adding roles, a section can be assigned (not required) by choosing from existing sections or typing a new one. You can also provide starting and ending dates for the role.

6. To save your changes click Save

25.1.3 Creating a Custom Role

To create a custom role, or edit privileges assigned to an existing role, do the following:

1. Mouseover the **People** item in the inline menu and click **Users** or select **Manage course users** on the Main Menu.

2. Select **Course Roles** on the **User Management** screen.

3. Select the role you wish to edit from the drop down menu. To create a new custom role provide a role name after **Define new custom role**. Click Next.

4. The **Edit custom role** screen will display the privileges set, and available to assign to this role. When creating a new role, buttons are available to use privileges which apply to standard predefined roles in the system (Course Coordinator, Instructor, Teaching Assistant etc.) as a starting point for assigning privileges to the new role.

5. Update the privileges you wish to assign to the custom role.

6. Click **Save**.

25.2 Course Calendar

To add an announcement to the calendar, do the following:

1. Select **Course announcements and my calendar** on the Main Menu.

2. Using the pull-down menus, choose a starting time and an ending time.

3. Type the announcement in the text box and click the **Post Announcement** button. The announcement will now appear on the specific date(s) on the calendar. Today's announcements has a yellow background. It will also show up on the **Roles** screen, next to the respective courses, and on the **Syllabus** screen as the date approaches.

To remove an announcement from the calendar, do the following:

1. Select **Course announcements and my calendar** on the Main Menu.
2. On the **Announcements and Calendar** screen scroll down to view the calendar shown on the screen.
3. If the announcement is in the current month, then check the box next to the announcement. If the announcement is not in the current month, then use the Previous Month and Next Month links to move to the correct month.
4. After you have selected the announcement to be removed, click Remove Checked Entries.

25.3 Course Chat Room

To use the course chat feature, do the following:

1. Select **Enter the chat room for the course** on the Main Menu.
2. A small chat room window will open up for chatting with other students, TAs, Instructors, and Course Coordinators affiliated with the course who happen to have their chat window open while inside their LON-CAPA course.
3. Type the message in the new window's text box.
4. Click the Post Anonymous or Post button.

Note: If the user chooses to post anonymously, only the course faculty will see the name of the person who posted. Certain emoticons are supported, along with LaTeX.

25.4 Surveys

Surveys are created by authoring a conventional problem, such as a Radio button or Option problem. During the authoring process, you will need to select one of the foils as "correct". Which foil is set to "correct" will not matter, however; that setting will be ignored when you implement the survey.

Within the course environment, to add a survey to the course, insert the "problem", and then set the parameter for **"Question Type"** to "Survey", "Survey with Credit", or "Anonymous Survey". To evaluate the survey, you will perform analysis using Reports -> Survey Results or Statistics and Analysis -> Detailed Problem Analysis.

The results examined with either tool will be displayed sorted by foil name, so take some care while authoring to name the foils. For example "Foil10" appears before "Foil2" alphabetically, so your survey may easier to interpret if you insert a zero before single digits, such as "Foil02" and "Foil10" which will sort as expected.

25.5 Evaluating a Resource

Evaluations can be submitted on any resource in a course by any user. To submit an evaluation, do the following:

1. Navigate to the resource you wish to evaluate.
2. Click on the Inline Menu.
3. At the **Evaluate Resource** screen, answer the questions using the pull down menus.
4. Add comments if necessary in the comment field.
5. Click Submit Evaluation.

The data that is provided through these LON-CAPA internal evaluations becomes part of the problem's catalog information.

25.6 Searching the LON-CAPA Resource Pool

LON-CAPA has a built-in search of LON-CAPA resources. Metadata exists for each resource published in the LON-CAPA repository. Much of the metadata which exists is reported by the author upon resource publication. Some dynamic metadata is tracked by the system as well.

To access the search functionality, select **Search the database of published resources and accessible protfolio files** on the Main Menu. If you wish to search for resources related to a certain word or phrase, the 25.6.1 Basic Search provides the capabitility to search a number of metadata fields at once.

If you have more specific needs, such as a desire to search on metadata not included in the basic search, the 25.6.2 Advanced Search will allow you to specify values for as many metadata fields you are interested in.

25.6.1 Basic Search

The Basic search page allows you to specify a phrase or expression to search for in the LON-CAPA resource repository. Search strings can contain quoted phrases, multiple words, '-' (meaning "not"), and multiple words or phrases joined with 'or'. For example:

- **cat** Matches resources about cats.
- **cat or dog** Matches resources about cats or dogs.
- **cat dog** Matches resources about both "cat" and "dog".
- **"fluffy cat" -dog** Matches resources on the phrase "fluffy cat" that do not contain "dog".

There are two checkboxes on the basic search page. The first allows you to limit your search to the domain of the machine you are currently logged into. The second causes a thesaurus lookup of your search phrase. Search results will include resources which match any of the related phrases as well as the original phrase.

The resource metadata fields searched in a basic search are listed below. It is worth noting that the data searched are self-reported by the resource author. In many cases, authors are unable to provide relevant values for the fields searched. If you need to search based on properties other than the following, use the 25.6.2 Advanced Search link on the basic search page.

- title
- author
- subject
- notes
- abstract
- keywords

25.6.2 Advanced Search

The Advanced Search in LON-CAPA allows you to search specific metadata fields for matching resources. Resources which match all of the constraints specified will be returned.

For many of the search fields, a "related words" checkbox is available. This causes each search term or quoted phrase in the search for that field to be matched in our thesaurus. Resources which matches in the given field any of the search phrases (depending on the logic in the original search phrase) will be returned.

The following fields can be searched:

- Title
- Author
- Publisher/Owner
- Author Space
- Last Modifying User
- Keywords
- Notes
- Abstract
- Standards

- Mime type
- Lowest grade level
- Highest grade level
- Domain
- Copyright
- Language
- Creation and Modification Dates

Dynamic metadata, computed based on resource usage statistics, can be searched as well. The following fields can be searched, with a minimum or maximum value being specified:

- Network-wide number of accesses (hits)
- Total number of students who have worked on this problem
- Average number of tries till solved
- Degree of difficulty
- Degree of discrimination

Evaluation data may be searched, with a minimum or maximum value being specified:

- Material presented in clear way
- Material covered with sufficient depth
- Material is helpful
- Material appears to be correct
- Resource is technically correct

25.7 Browsing Resources

Click **Browse published resources** on the Main Menu to browse the LON-CAPA resource pool. This is the same interface used when importing a document into your course documents except that you only have permissions to view the resources, not select them for importing. Note that at the top of the Resource Space Screen there are some options. For example, selecting "Title" will display the titles from the metadata from each problem. Selecting "All versions" will show all versions of the resource which are saved whenever the resource was republished.

The resources are organized by the domain, then the username. The **Recent** dropdown box provides a shortcut to recent browsing history.

25.8 Viewing Resource Catalog Information

Go to any resource in your course, then click on the Inline Menu to view the resource's catalog information. The catalog information is made up of metadata, such as title and keywords. Other catalog information include statistics of the resource's use and user evaluation.

25.9 Annotations

Annotations can be created to any resource in a course by any user. To create an annotation, do the following:

1. Navigate to the resource you wish to annotate.
2. Click on the Inline Menu.
3. Type your notes, and save them by clicking Save

When you return to the resouce at a later time the icon will have changed into . Clicking on , you can view and edit your previous notes.

25.10 On Deleting Courses

A course can not be "deleted" from a LON-CAPA server. Courses occupy very little storage space, and an inactive course is not a burden on the system. On the other hand, allowing data to be permanently deleted could lead to serious accidental data loss.

You *can* expire the roles for all users in the course. For example, when you use **Add/Modify a Student** or **Add/Modify a Course User** to put students or Course Coordinators into a course, you can set an ending date for those roles. When the ending date is reached, the role associated with the course will not be accessible to the user any more.

If you view the **User Roles** screen, you will see a checkbox at the top that allows you to display all roles. If you check that box and click the Update display button, you can see your current and expired roles, if any.

It is a good idea to get into the habit of setting end dates for all courses.

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