# Course-Management System: Design Project Proposal

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## ABSTRACT

A *design* project proposal for a course-management system is presented here. Such a system allows University students to enroll in courses, view their schedule and perform other course-related tasks from a web portal. The proposed project as well as suggested improvements are first explained. Four Canadian university course-management software surveys are then presented. Each survey has a brief description followed by a critique of the major usability flaws and strengths. Along with each survey, two of the most important features of each system will be further analyzed via hierarchical task analyses.

## PROJECT PROPOSAL

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### Overview

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### Suggested Improvements to Existing Systems

There are a variety of improvements that could be made to course-management systems when compared to existing products. The software surveys identify several key areas of weakness, and solutions to these are presented below.

#### *Dynamic Element*

One of the highlighted points of weakness in all the systems surveyed is the ability to surface the most relevant data to the user quickly and consistently. To improve this aspect, the concept of an intelligent, "dynamic" element is proposed. This prominent element will be the first thing users see when accessing the webpage. Several factors including the current date and enrollment status will be used to determine which task the user is most likely to perform.

For example, when the user accesses the system during exam season, the element will display the student's exam schedule. During the course registration period, the element will display information related to course registration. If a user is not yet accepted into University, the element will display their application status.

This dynamic element will help users quickly find the information they are looking for by making information more visible and easier to access. If the user wishes to perform a less common task, all functions will continue to be displayed below in a static and consistent manner.

#### *Improved Navigation*

Many tasks performed by users of course-management software are broken into several steps. A weakness of the existing products is in visually showing the user at which step they are at. A proposal to improve on this is to include a navigation element when the user is engaged in a multi-step task. This element would show which step the user is currently on, and would include the ability to go back to a previous step, or jump ahead to the first uncompleted step.

This visual indicator would improve the user's comprehension of how the system works, and would give them the ability to better navigate between steps. It would also improve user satisfaction, as they are less likely to become impatient when they know exactly how many steps they have completed and how many remain.

#### *Smarter Schedule Generation*

Currently, the general process for selecting lecture, tutorial, and lab times when enrolling in courses can be broken down into the following steps. First, the user selects their desired and required courses. Secondly, they manually select times for each course, and the system generates their schedule. After viewing their schedule, users often have to go back and switch times to ensure there are no conflicts, or may wish to change times to have a more desirable schedule. One important goal of the project is to simplify this process by employing a more intelligent schedule generating system.

After the users selects their desired and required courses, the system will generate several different timetables based on those courses. It will display all timetables that don't have any conflicts. These will be ordered based on perceived "desirability", which will be judged based on several factors including gaps between classes and start / finish times. The user will be able to filter certain schedules based on their own requirements and wishes, such as schedules that end after a certain time.

Implementing such a system would simplify one of the more tedious processes a user must perform, and will result in better schedules for users.

## SOFTWARE SURVEY

Four course-management systems from Canadian universities have been selected for review. For each system, a brief description will be followed by a critique of the major usability flaws and strengths. From this, the main goals and tasks of users using the systems will be extracted. Finally, the two most important of those features will be further analyzed via hierarchical task analyses. Screenshots will be presented to reinforce the arguments in the critique for each software review.

### McMaster University – Mosaic

*Description*

The purpose of the software is to allow students to manage their courses (enrolling, dropping etc.), and view information about their current status (current timetable, enrollment status, financial balance etc.). The main interface for the software consists of several collapsible modules encapsulating different aspects of the software in a main column. These include Academics, Finances, Personal Information, and Admissions. A small column to the right holds less common sections, such as Enrollment Dates and Graduation. The focus of this analysis is on two common tasks – enrolling in courses and viewing one's course schedule.

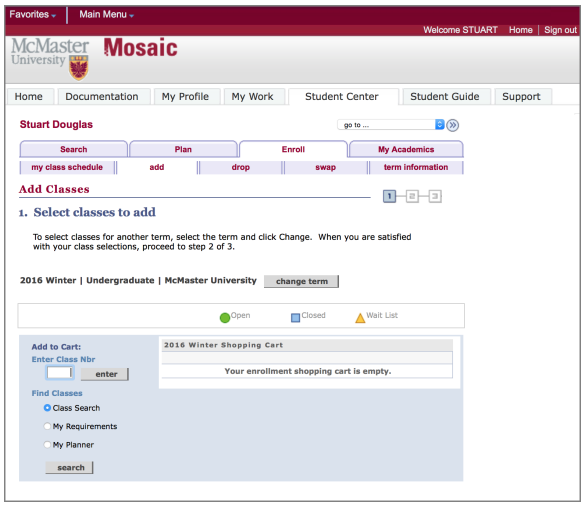


**Figure 1: Selecting courses to enroll in – Mosaic**

*Critique*

The largest usability flaws in Mosaic center around difficulty to access required information. Combined with an unintuitive and inconsistent navigation interface, the software is . The HTA for enrolling in a course demonstrates this through the large number of steps required to perform a routine and common task. Other functions are hidden behind dropdown menus, and are difficult to discover.

The navigation is separated into a top navigation bar separated by user-type (e.g. Students and Employees). Within the student center page, functions are separated into modules, an effective strategy to group related functions. Navigating to one of the sub-functions (such as enrolling in a course) presents secondary and tertiary menus below the main one. Navigation within one of these is handled by blue text hyperlinks back to previous pages. Native back and forward browser functionality does not work. There is little visual indication of where the user is beyond the navigation bars at the top, which do not go to a depth sufficient to cover all pages used when performing common actions, such as enrolling in a course.

### Guelph University – WebAdvisor

*Description*

Guelph University's course enrollment software, WebAdvisor, provides a variety of functions for students to manage their courses. The student page interface contains two columns – a main column with course-related news, and a righthand column with links to each of the functions (Register for Courses, View Schedule etc). These "function" pages are one column, and may contain several sub-pages as processes are broken into steps. Navigating between sub-pages is done using native browser back and forward buttons. If an error occurs, such as no courses found for specific search criteria, a large box is displayed with information about the error and the option to search for a solution.

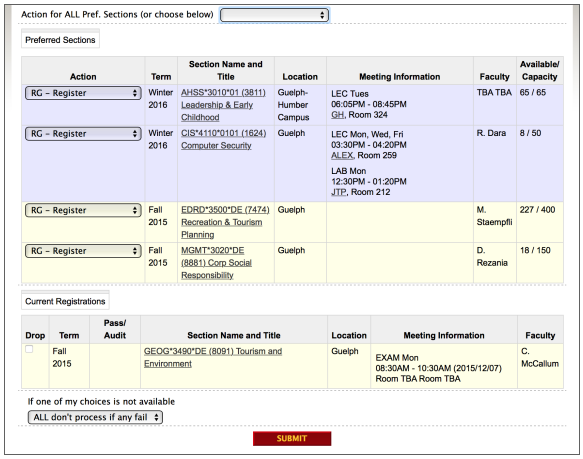


**Figure 2: Registering for preferred courses – WebAdvisor**

*Critique*

There are a variety of usability issues associated with WebAdvisor that could be improved upon, especially in the area of navigation. There are also certain strengths to the system as compared to others surveyed. The navigation issues largely stem from a lack of consistent navigation elements to show the user where they are. For example, when enrolling in a course there are several steps that must be completed (refer to HTA – WebAdvisor, Enrolling in A Course). The user is not aware how many steps there are total, how many they have completed or how many remain.

Another large usability issue is an inefficient use of space on the main page. The visibility of important functions is reduced by putting all functions in a small column to the right of the main content. This main content contains news items, such as exam period times and service outages, generally information that the user is less likely to need than the functions beside it.

WebAdvisor does do some things quite well from a usability perspective however. One of the most common tasks is enrolling in a course, and WebAdvisor has the most streamlined process of all universities surveyed. Although it is not always clear at which step the user is at as discussed above, the process is straightforward and contains much fewer steps than performing a similar task using a different system.

### Carleton University – Central

*Description*

Central is the course-management system for Carleton University. It has a similar feature-set to the other systems surveyed. This includes allowing users to enroll in courses and view their schedule. The user interface for Central primarily is based on text links to different pages, with very little use of icons or colour. The main student page is a one-column list of text links to the various student-related categories of functions. A tab bar at the top lets the user switch between different sections of the system including Student Services and Employee Services.

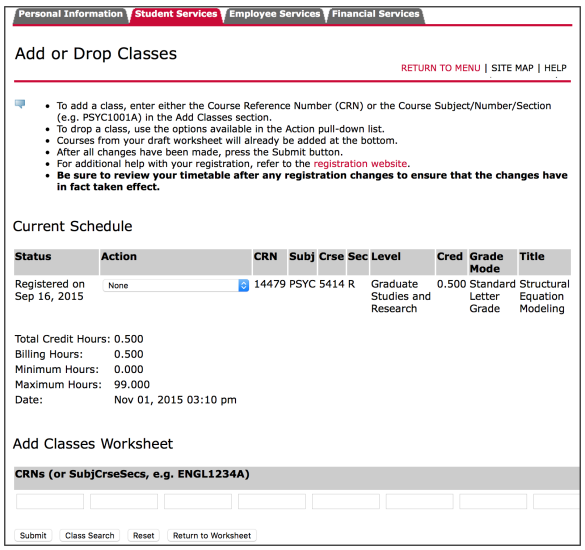


**Figure 3: Add courses view – Central**

*Critique*

There are a large number of prominent usability flaws in Carleton University's Central course-management system. Visibility of common functions on the main page is very low, as a long list of hyperlinks contains all the categories (e.g. Registration, Student Records etc) requiring the user to read each one until they find the correct one. Once a category is selected, then another list of hyperlinks to each of the functions in that category is shown (see figure 4). Again, the user must read through each one until they find the desired function.

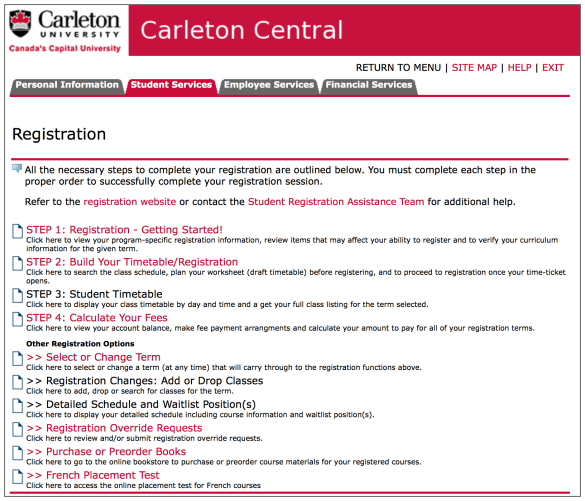


**Figure 4: Registration main page – Central**

Another large usability flaw is the poor mapping between many actions. For example, when adding a course, the user first enters a course number into one of several (unlabeled) input boxes, and then they click the Submit button (see figure 3). The submit button is aligned with other buttons for Class Search, which takes the user to a separate page, Reset, which undoes their changes, and Return to Worksheet which navigates the user to a page showing them their preferred courses. These buttons are not all related, and grouping them together may confuse the user.

Overall, Central is a relatively unintuitive system, requiring users to spend more time finding the information they need through poor mappings and a lack of a visual hierarchy.

### Waterloo University – Quest

*Description*

The Quest system is designed to let students manage several aspects of their university enrollment, such as course management, financial inquiries, and contact information. Students can also sign up for a GO Bus pass, view their grades and transcript, and check the status of scholarships and other applications. The main page is broken up into 8 collapsible sections, 4 main sections (Academics, Finances, Personal Information, Admissions) with another 4 sections in a sidebar (Holds, Finance Information, Academic Information, Other Useful Links). The critique will focus on enrolling in courses and viewing a user's course schedule.

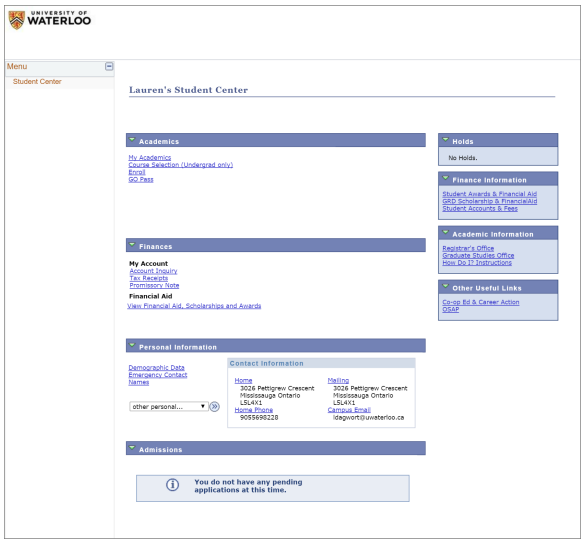


**Figure 5: Student main page – Quest**

*Critique*

Quest has some major usability issues when it comes to providing the user to information and functions they can use. The system is notorious for hiding options and menus from the user, requiring several screens of drill down menus before being able to access any meaningful options. The menus look unfinished or poorly formatted, and it is easy to become lost and confused while navigating the various pages. Navigation on the main page is done using hyperlinked text, while traversing the deeper options is done using blue menu tabs. Native browser back and forward commands generally work as expected, which makes navigation a little more manageable.

## CONCLUSION

We have discussed several proposed improvements to a course-management system. These include a dynamic element highlighting the most-needed feature based on several factors, an improved layout with better indicators, and a more intelligent course scheduler. We have also provided a software survey for four Canadian university course-management systems. For each survey we critiqued the software as well as analyzed the two most important features via hierarchical task analyses, presented at the end of this paper.

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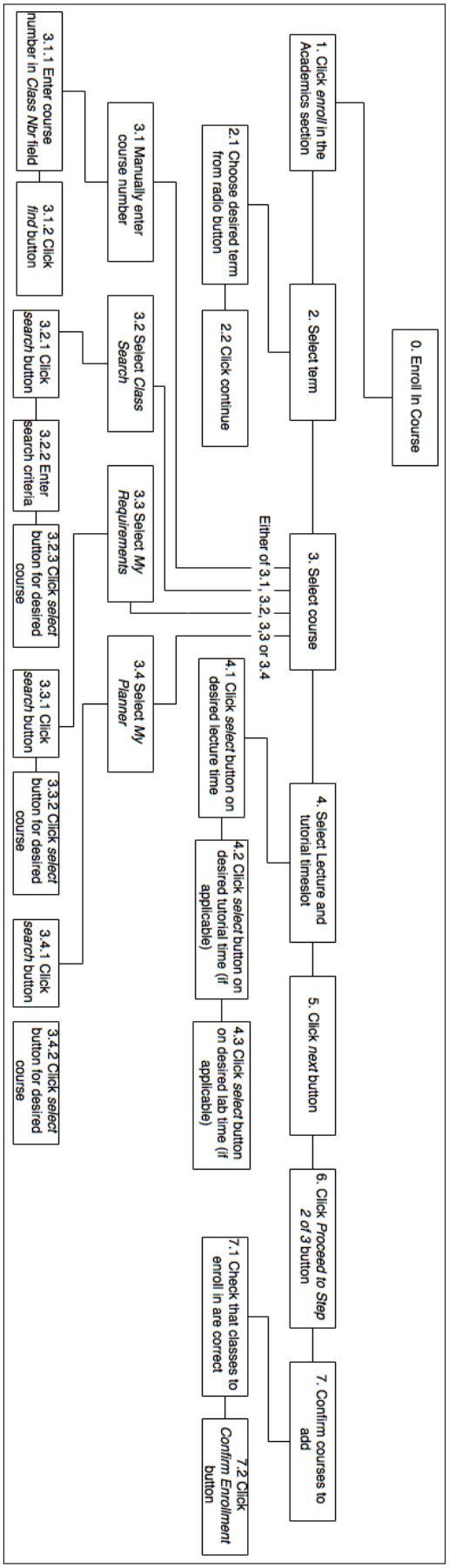
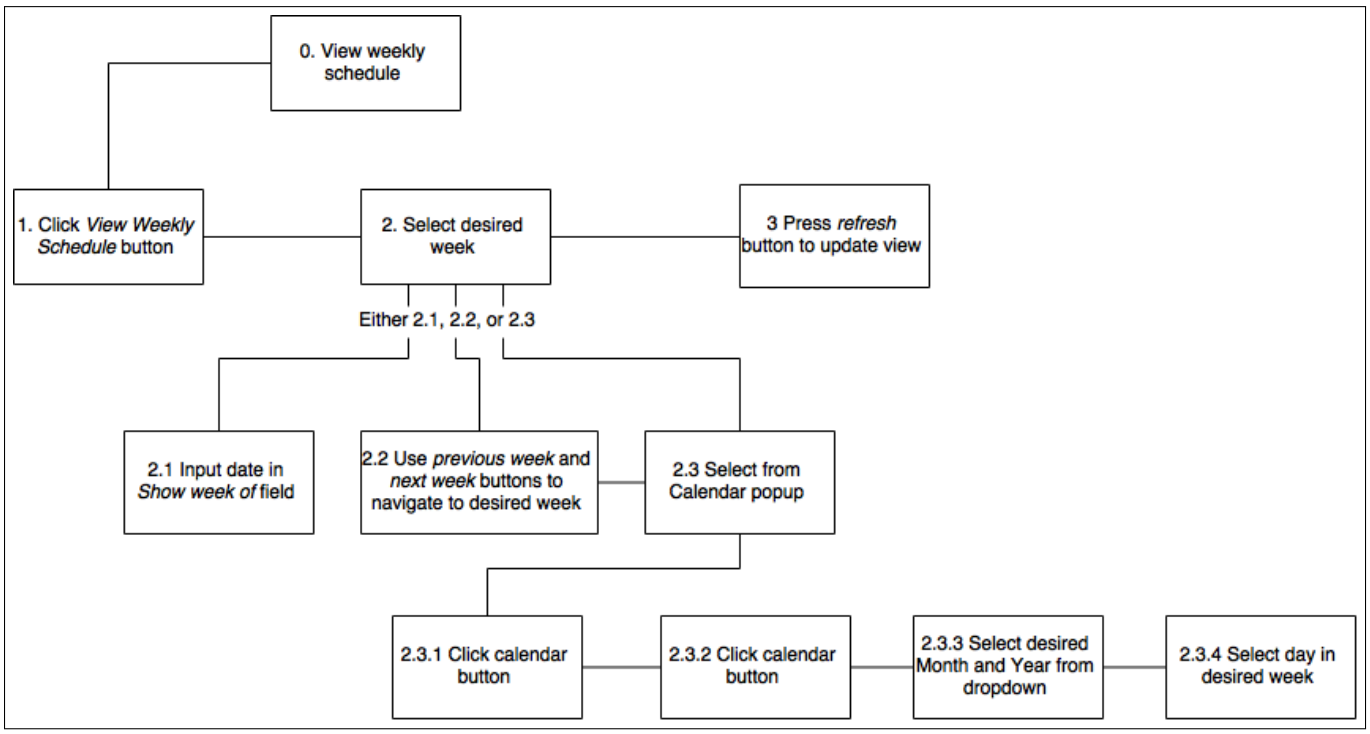
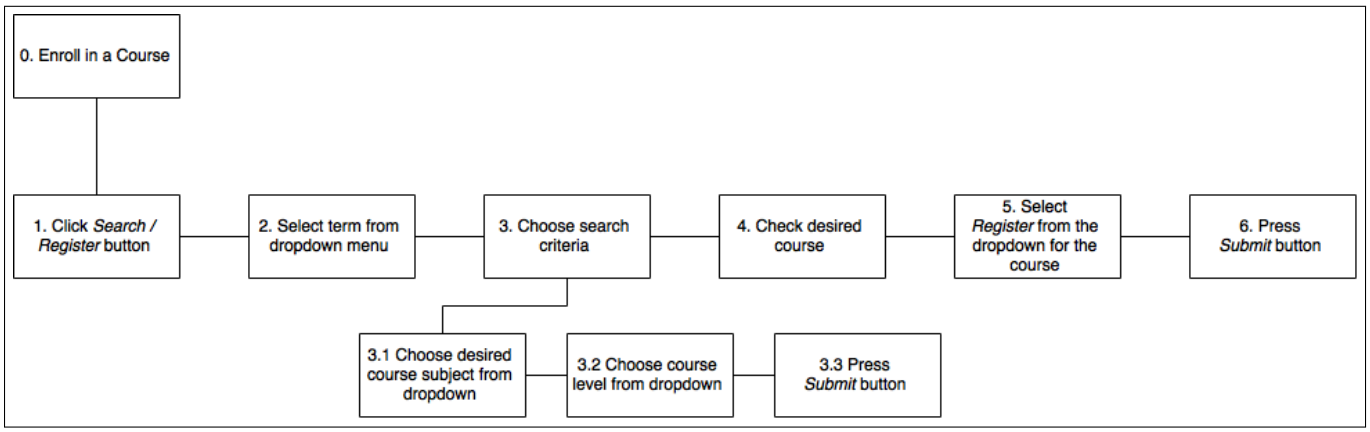


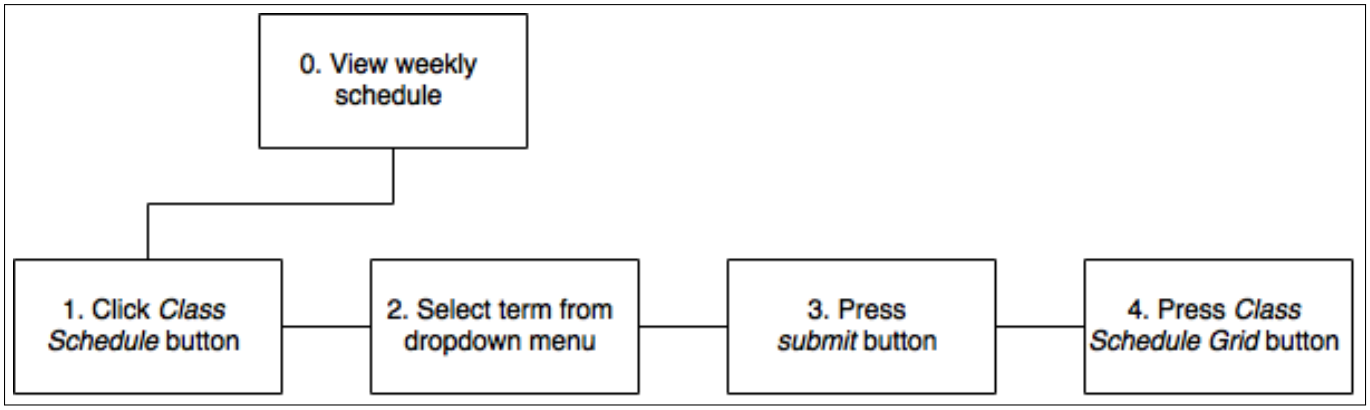
**HTA - MOSAIC, VIEWING WEEKLY SCHEDULE**



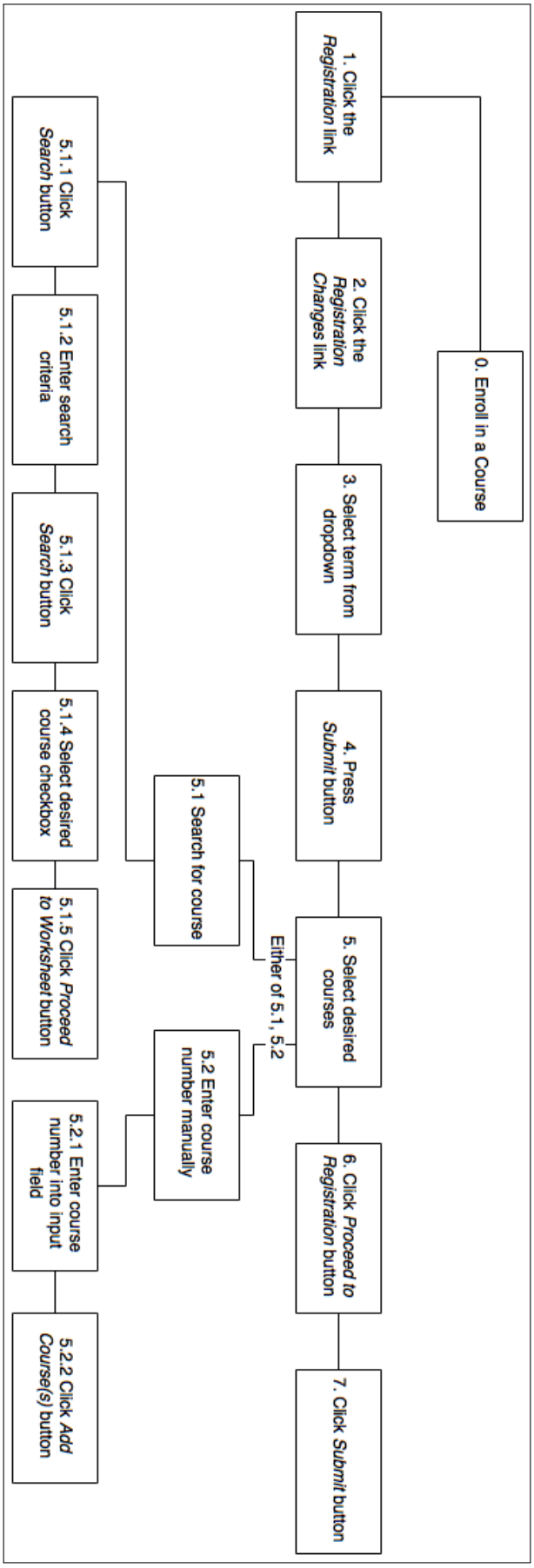
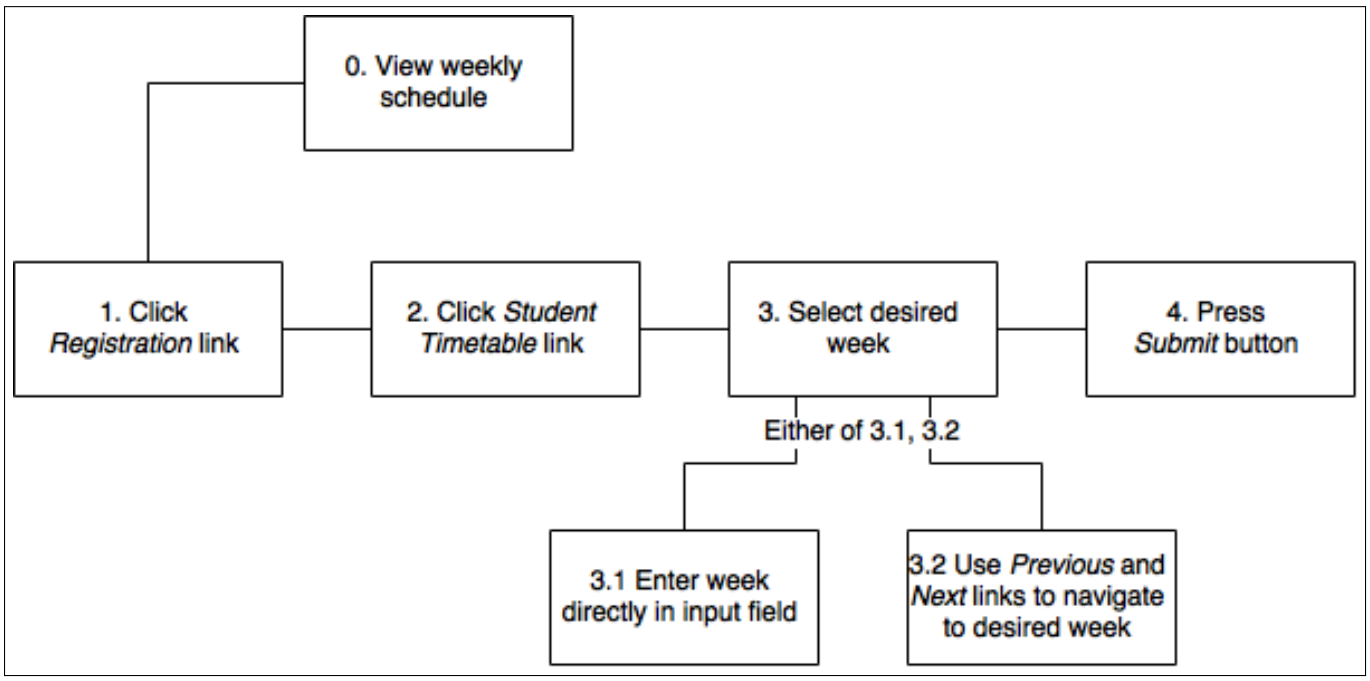

**HTA - WEBADVISOR, ENROLLING IN A COURSE**




**HTA - WEBADVISOR, VIEWING WEEKLY SCHEDULE**



**HTA - CENTRAL, ENROLLING IN A COURSE**



**HTA - CENTRAL, VIEWING WEEKLY SCHEDULE**