

THE USTAD REPORT

(THE USER STUDIES, TASK ANALYSIS AND DESIGN REPORT)

FOR

Expertise-Based Study Review



By

Kittipong Techapanichgul

Shruti Parikh

Zhiwen Yu

INFSCI 2470 INTERACTIVE SYSTEM DESIGN

March 30, 2005

Content

The Usability Study of the “Career Scope” Page In Course Agent System	2
Introduction	2
User study & Task analysis	2
Questionnaire Analysis	3
Questionnaire Conclusion	4
Thinking Aloud Protocol	4
Hierarchical Task Analysis (HTA)	5
Notices from the Interface of the Current System	6
Notices in “Career Interests” page	6
Proposed Interface for “Career Interests” Page	9
Notices in “Career Scope” page	10
New interface for “Career Scope” Page	12
The Usability Study of the proposed interface (#2) for “Career Scope” Page in Course Agent System	15
User study & Task analysis for proposed interface #2	15
Questionnaire Analysis # 2	15
Questionnaire Conclusion # 2	16
Thinking Aloud Protocol # 2	16
Hierarchical Task Analysis (HTA) #2	17
The Latest Interface for “Career Scope” Page	18
How Does The Latest Interface for “Career Scope” Page Work?	19

The Usability Study of the “Career Scope” Page in Course Agent System

Introduction

The course agent system is an adaptive online course recommendation system, which is designed for students and faculties in the School of Information Sciences who have interests in the courses offered at the school. The system can help them find appropriate classes according to their career goals as well as creating their study plan.

Basically, the system can be divided into six main parts in which “Career Scope” page is one of them. Our group attempts to enhance the user interface of the “Career Scope” page and the page created for adding career interests. Thus, we all agree to use some techniques and design principles we have learn from INFSCI 2470 Interactive System Design class to capture important issues about the current interface, which will allow us to design a better interface for those two pages.

User study & Task analysis

In order to study users’ behaviors, responses, interactions with the system, we not only decided to apply user study techniques but also perform task analysis. We have created a questionnaire with 14 questions asking for user opinions, used thinking aloud protocols and built hierarchical task analysis to model an alternate interface, which we hope will support users’ tasks as much as possible. Since the main users of the system are students and faculties in the School of Information Sciences who are highly familiar with computer technology, we infer that the targeted users must have enough skill to do simple tasks. As a consequence, we will focus on how to improve the usability of the current interface for the intermediate and proficient users only.

However, we still use a questionnaire to collect user opinions after playing with the system. Then, the answers from the questionnaire will be analyzed in order to indicate the satisfaction, performance and usability of the current interface. With the current interface evaluation, we will use these feedbacks to design a new interface which is able to serve the targeted users better.

Questionnaire Analysis

After analyzing the result of the questionnaire, we can conclude the satisfaction, performance and usability of the current interface in the Figure 1 shown below.

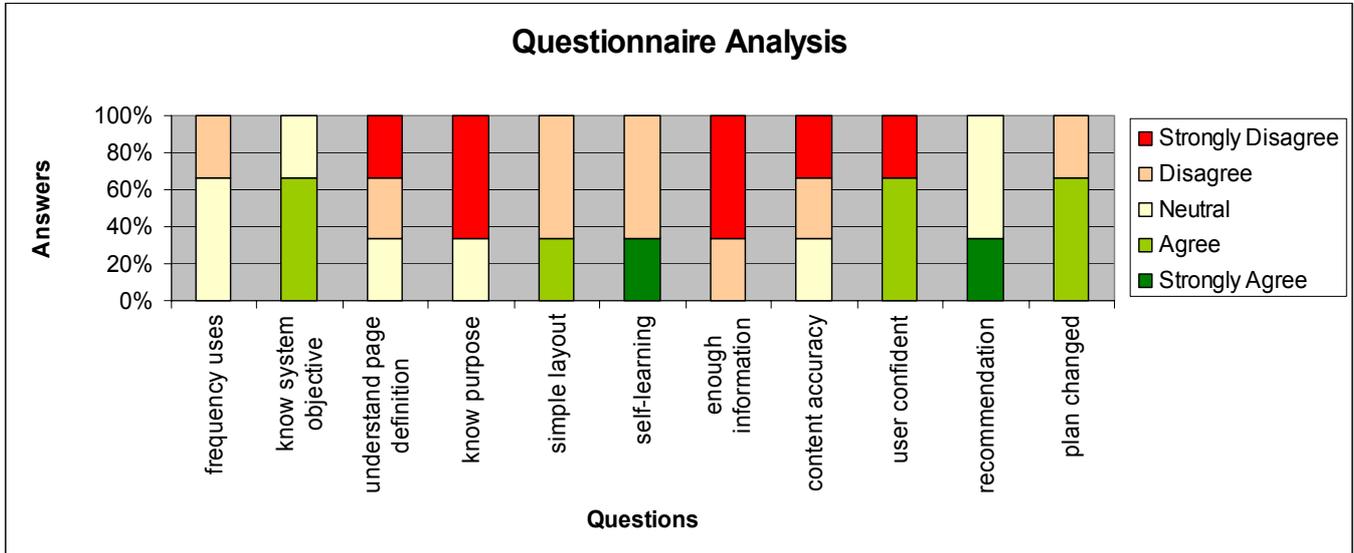


Figure 1: Questionnaire Analysis (From Answer4 to Answer14 legend by “Strongly Disagree” to “Strongly Agree”)

From figure 1, regardless the white regions, the red and pink regions indicate the dissatisfaction of the design issues while the light green and dark green regions indicate the satisfaction. First of all, we notice that the layout of this page is so simple and well organized that most users are satisfied with the style of the current interface. We believe that this advantage can improve user capability in making a decision about recommended classes better.

However, most users face difficulty in using the “career scope” page because of lack of instructions and necessary information. For example, most users know the system goal but they don’t exactly know the objective or goal of the page. One possible reason is that the first page of the course agent system provides users rough idea about the system while the “career scope” page has only “Career vs. Courses Taken” as the title of the page. Also, the current interface for “career scope” page still has not enough information to help users decide what the classes they should take, which seems to be the primary objective of this page. It also seems to be the most critical problem in user perspectives because it contributes to the widest red region.

Besides, the system doesn’t explain any reason to the users to solve the system problems made by user mistakes. For instance, if a user adds a recommended class that already exists in his study plan into the study plan again, the system will not tell the user that he is trying to add the duplicate class into his study plan. Unfortunately, the system keeps telling the “Failure” message, which makes users to figure out by themselves what they are doing wrong. This kind of system error message possibly downgrades users’ confidence in the system as well as the frequency of using the system. Furthermore, some contents in the page are still vague, which may confuse some users. Sometimes it leads to a kind of question like “What is this information for?” or “How can this information help me?” As a result, users have to put extra effort to learn how to use the page and the information in the page by themselves.

Questionnaire Conclusion

From the result of the questionnaires, we can summarize necessary design aspects that we must consider as criteria used for re-designing the interface. The new interface must have the features as follows:

- Have simple and well organized layout
- Make the contents concise and straightforward
- Give users a rough idea of what the page objective is
- Hint users on how to use the page
- Provide enough information to support user activities
- Include solution for possible problems into error messages

Thinking Aloud Protocol

We used thinking aloud method as an approach to study user activities. In this method, a user and our team member were talking to each other while the user performs a test task. We asked users to use the Course Agent System focusing on the “Career Scope” page only. After this study, we were able to understand better on what the users are thinking and what the users are trying to do as well as their comments and questions.

We have selected some important parts of the thinking aloud protocols in modeling the new interface. The table below shows our interpretation according to the dialog between user and our team member and the observation of user actions.

User's actions and comments	Our interpretation
<i>U: Maybe because I already added it to the course plan list. But, why didn't it tell me that the class is already in my study plan. So confuse.</i>	<ul style="list-style-type: none"> • The ‘Career Scope’ page didn’t provide enough information to help user to understand it.
- User clicks the drop down menu to pick the same class, that is, INFSCI 2710. - After clicking the button, it shows failure message. <i>U: Why did it show failure again?</i>	<ul style="list-style-type: none"> • This page didn’t provide enough instruction for user.
- User goes back to ‘Career Scope’ page. <i>U: The numbers of courses I have evaluated are 3. Then why it shows only 1 class in the page? The system doesn't seem to be consistent!!!</i>	<ul style="list-style-type: none"> • The layout of interface is simple and organized. • The system is somewhat not consistent.

Note that U: User, Regular Font: User action, ***Bold & Italic Font***: User comment

This result suggests us to focus more on the content part and the page style. Specifically speaking, we have to make the content of the page concise but easily understandable. Also, we have to maintain the simplicity of the page.

Hierarchical Task Analysis (HTA)

Users can use the ‘Career Scope’ page to find courses which will use as steps to pursue their career goals. In order to use the ‘Career Scope’ page, most users would follow these steps:

1. Log in Course Agent System
2. Fill the information into MyCourseAgent page
 - 2.1 Insert career goal into list of career interests in the “Career Interests” page
 - 2.2 Add courses the a user has already taken into the list of course taken in the “Courses Taken” page
3. Go to ‘Career Scope’ page
4. Find appropriate courses and add to study plan
 - 4.1 Go to View Recommended Courses combo box for each career goal
 - 4.2 Pick a course
 - 4.3 Click Plan button
5. Log off from the system

plan 0: do 1-3-4-5. If there is no career goal in ‘Career Scope’ page, do 2-3-4-5.

plan 2: do 2.1-2.2.

plan 4: do 4.1-4.2-4.3.

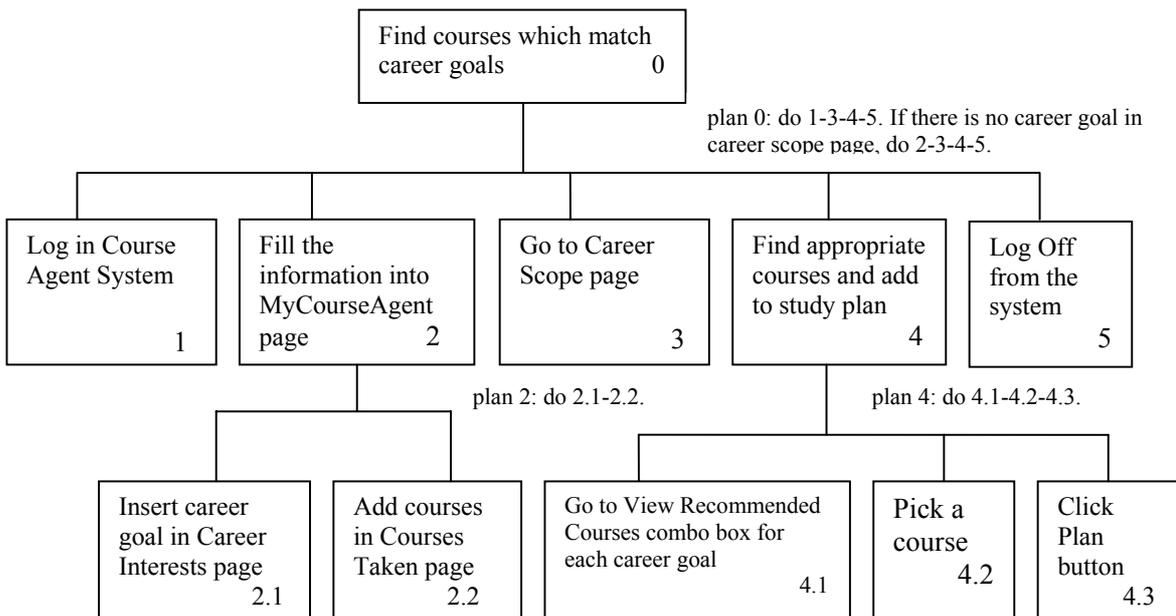


Figure 2: Task Hierarchy for Finding Appropriate Courses

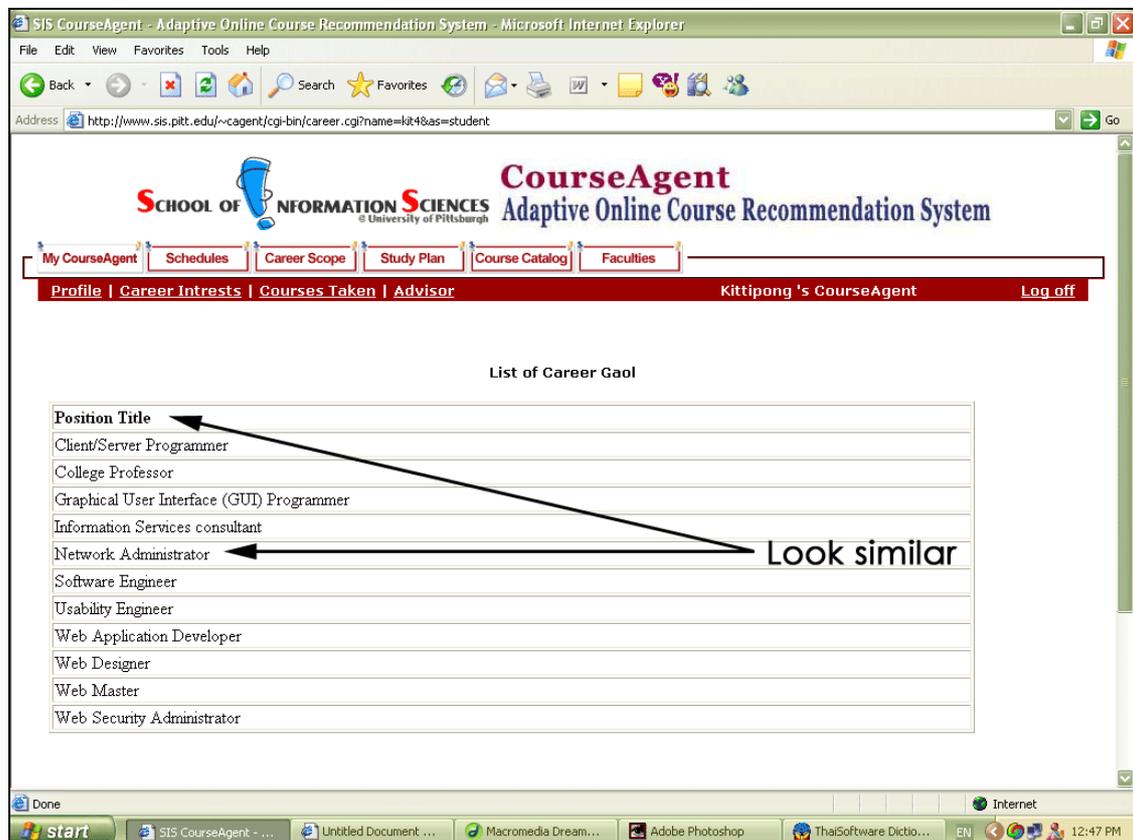
Notices from the Interface of the Current System

As we were analyzing the current interface, we noticed some parts of the interface that are likely to increase the level of user fault actions, user burdens and user misunderstanding. Although it just minor problems appearing in current interface, it is worth noting these remarks in order to make a better version of the interface.

Notices in “Career Interests” page

- NOTICE 1: No much difference between the table head and the table body.

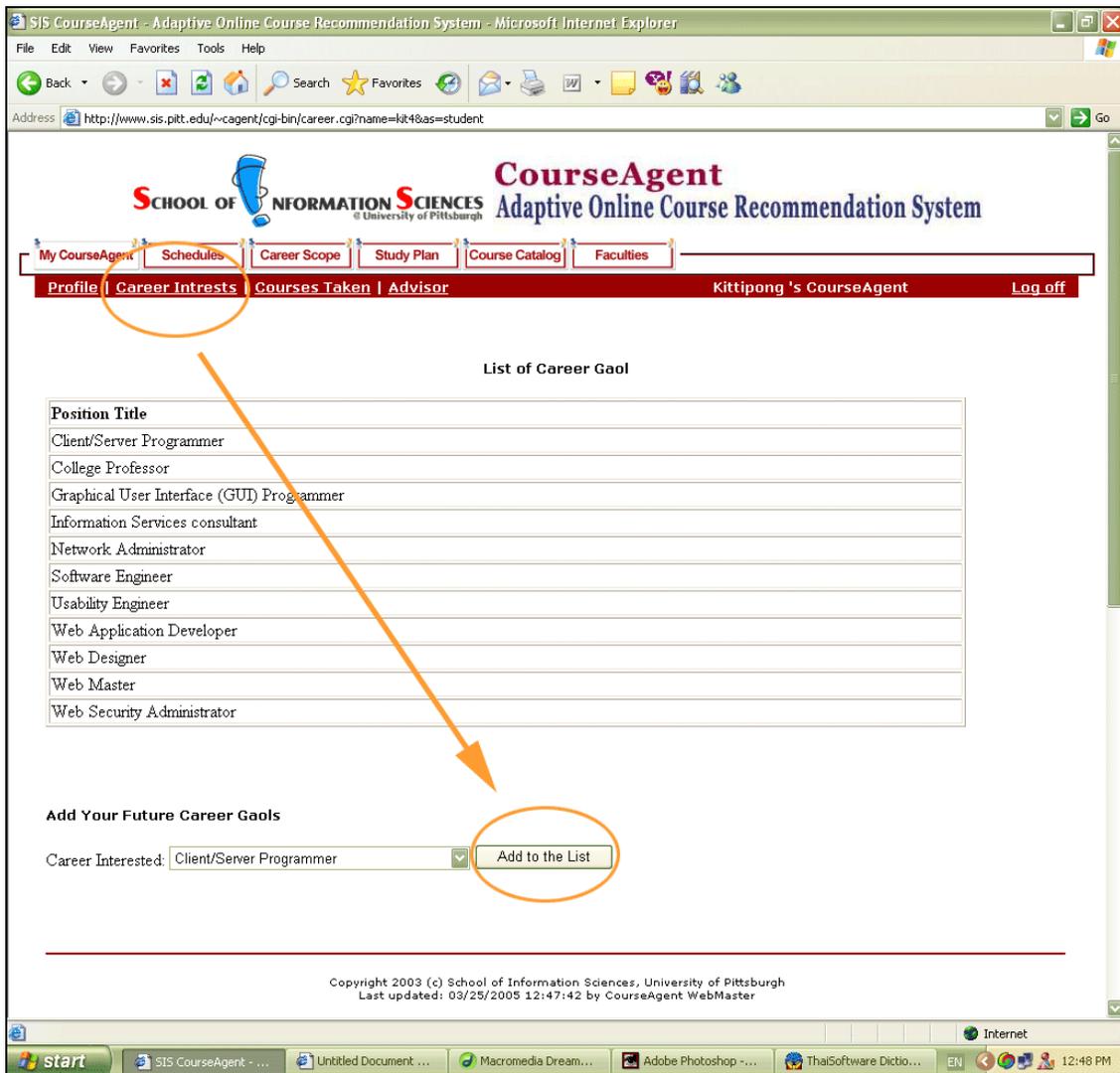
The head of the table and the body look very similar. As a result, user could misunderstand about the list of career goals if they don't read it carefully. The image below shows little difference between the head and body of the table.



NOTICE 1: No much difference between the table head and the table body.

- NOTICE 2: The distance between the “Career Interests” link and the “Add to List” button increases as career goal list is growing

While the list of career goal is growing bigger, the drop-down list and the “Add to list” button is slightly far away from the top of the page. Therefore, it imposes burdens to user in doing scrolling. Also, it makes users little confused about the position of the drop-down list and the “Add to list” button because it always moves to a new position. It would be better to have the button and the drop-down list stay close to the top of the page since users will add new career goal to the list easily and see the list and button obviously.

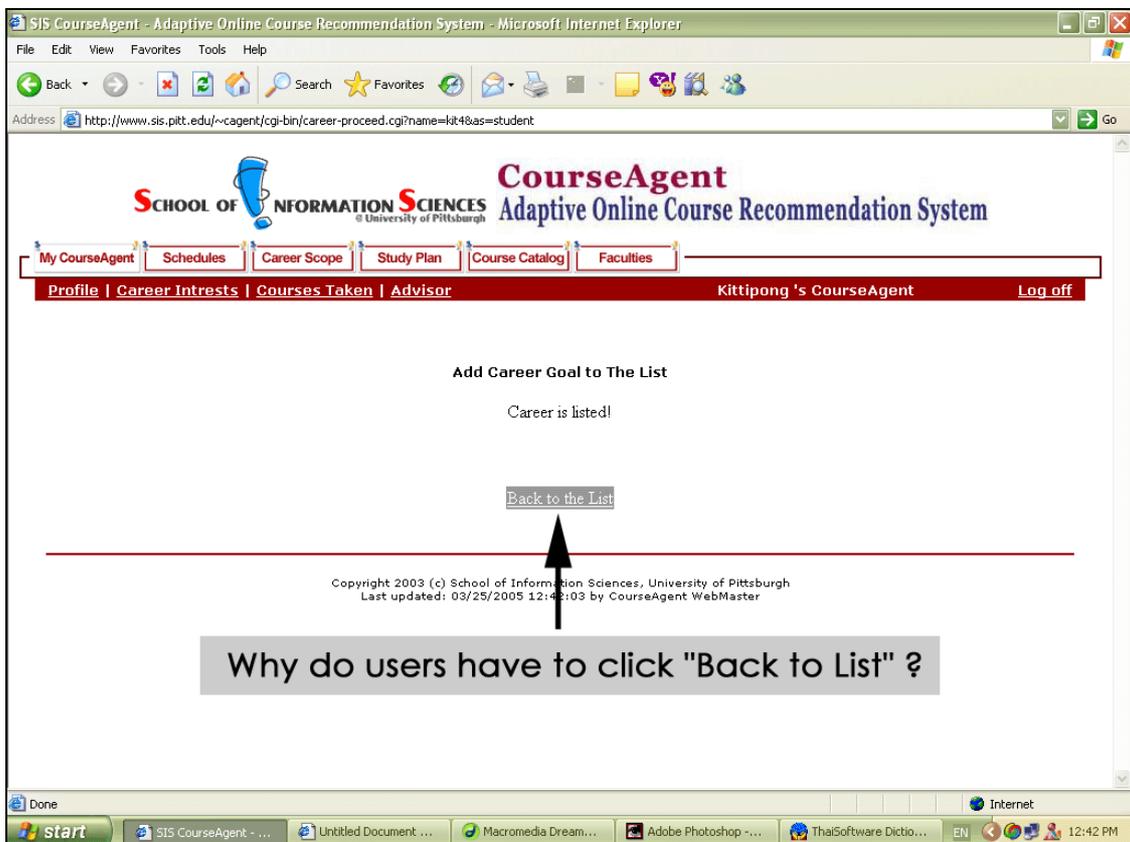


NOTICE 2: The distance between the link and the button increases as career goal list is growing

➤ NOTICE 3: Drawback of the “Back to the list” link

After a user click “Add to list” button, it will show another page as shown below. We believe it is not necessary to have this page because the user must click “Back to the list” link in order to see the list of the career goals every time he enters new career goals. Imagine that the user wants to add many career goals into the list; it would consume user time and effort in clicking “Back to the list” link.

We think the page can update itself to show the list with new career goal the user just added. In the same time, it may also show the “Career is listed” message in the same page. This way would support his activity better and relieve user’s burden.



NOTICE 3: Drawback of the “Back to the list” link

Proposed Interface for “Career Interests” Page

From the three notices mentioned above, we have designed a new interface for “Career Interests” page as shown in the images below. The advantages of this proposed interface are:

- More relieve user effort (Reduce Clicking and Scrolling)
- Support user activity better (Provide list and button at the top of the page)

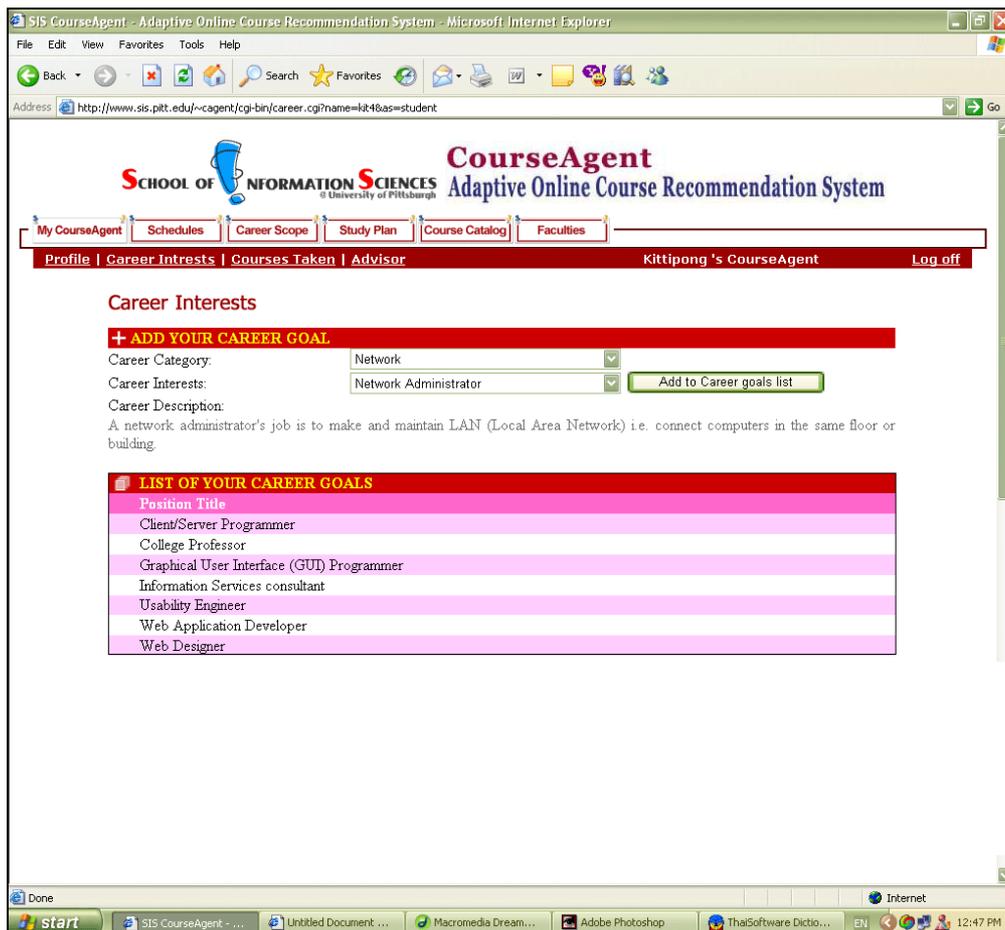


Figure 3: Proposed Interface for “career interests” page

With this interface, a user can select career goal by using career category’s drop-down list to filter out the careers which do not belong to that category. Options in the career category’s drop-down list will not contain any exist career in order to prevent errors from entering duplicate career goals into this career goal list. Thus, the user can select career faster and correctly. Also, it provides a rough idea about the career in career description section which will show task scope and related responsibilities. Besides, the list of career goals is separated from entering career part. Therefore, it can obviously be seen which part for entering career to the list and which part for presenting the career goal list. After the user click “add to career goal list”, it will just update the page, that mean the new career will be displayed in the list immediately. This might help user

relieve their effort and support their main activity that is to enter the career goal into the career goal list.

Notices in “Career Scope” page

- NOTICE 4: No course name in the recommended course drop-down list

Since the drop-down list containing recommended courses provides only course code, when a user clicks to view recommended courses, he may not know what the course is from only reading course code. In most cases, users will remember the name of the course rather than course code. In order to minimize user memory load, course name suppose to be given next to the code in the drop-down list, which will give user an idea what the courses is.

The screenshot shows the SIS CourseAgent web application interface. At the top, there is a navigation menu with options: My CourseAgent, Schedules, Career Scope, Study Plan, Course Catalog, and Faculties. Below the navigation menu, the user's name 'Kittipong 's CourseAgent' and a 'Log off' button are visible. The main content area is titled 'Career vs. Courses Taken' and includes a sub-header 'Don't know what the subjects name are'. It displays a table with career goals and their corresponding recommended courses. The table has two columns: 'No. of Courses Taken' and 'No. of Courses Evaluated'. The career goals listed are: Client/Server Programmer, College Professor, Graphical User Interface (GUI) Programmer, Information Services consultant, Network Administrator, and Software Engineer. For each career goal, there is a 'View Recommended Courses' dropdown menu and a 'Plan' button. The dropdown menu for 'College Professor' is open, showing a list of course codes: INFSCI 2550, INFSCI 2610, INFSCI 2710, and INFSCI 2810. A red circle highlights the course codes, and an arrow points to them from the text 'Don't know what the subjects name are'. The bottom of the screenshot shows the Windows taskbar with the start button, several open applications, and the system clock showing 1:28 AM.

Career Goal	No. of Courses Taken	No. of Courses Evaluated	Recommended Courses	Action
Client/Server Programmer			View Recommended Courses -----	Plan
College Professor			View Recommended Courses ----- INFSCI 2550 INFSCI 2610 INFSCI 2710 INFSCI 2810	Plan
Graphical User Interface (GUI) Programmer			View Recommended Courses -----	Plan
Information Services consultant			View Recommended Courses -----	Plan
Network Administrator			View Recommended Courses -----	Plan
Software Engineer			View Recommended Courses -----	Plan

Notice 4: No course name in the recommended course drop-down list

same time whenever the user focuses on a recommended class (by selecting a recommended class in the drop-down list).

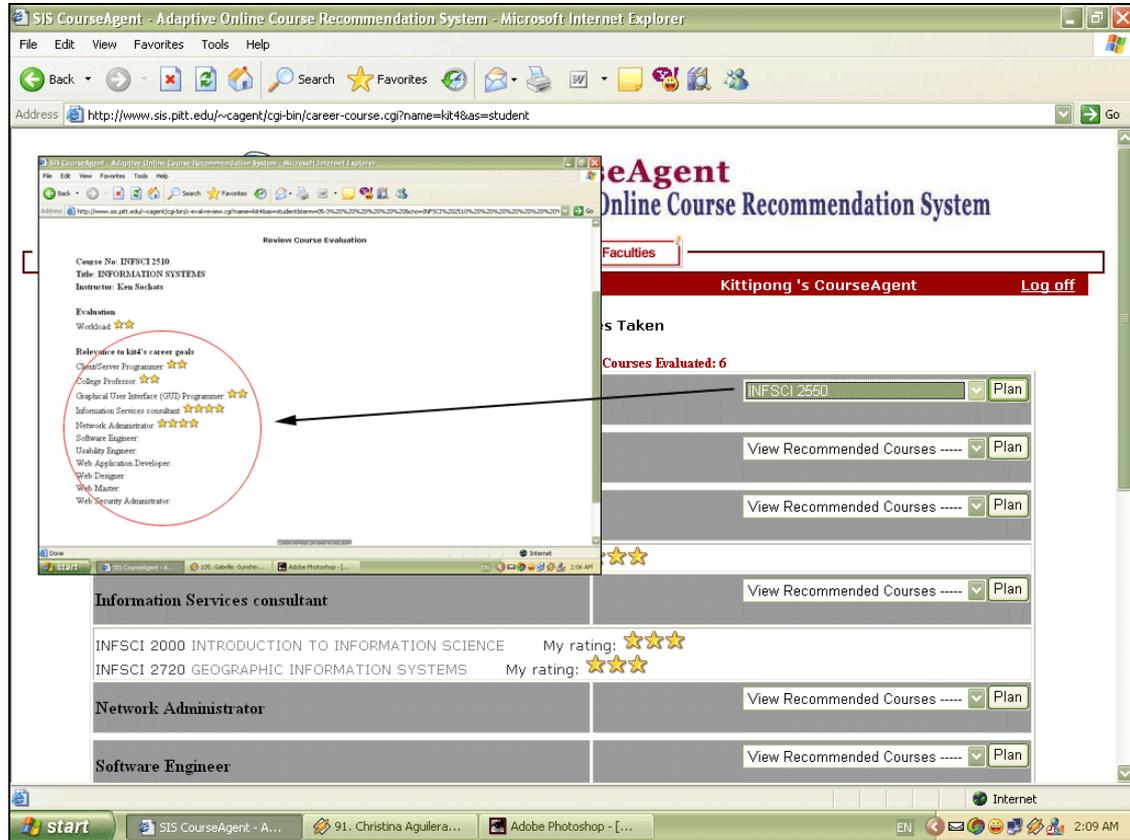


Figure 5: the concept of the proposed interface, which has two types of information in the same time

New interface for “Career Scope” Page

From the last two notices we just mentioned, we have designed a new interface for “Career Scope” page as shown in the two images below. The interface was designed for supporting user activity that is to choose class into their study plan. Also, we try to make it so simple that users can understand and learn what the objective of the page is and how to use the interface by themselves.

The first image is the initial state in which a user has not yet selected any recommended class. Thus, the page will show information about how classes they have taken before relate to each of their career goal only. The blue stars present the level of all previous class contribution to each career goal. At this point, the user will know how much previous classes contributed to each of his career so far. The more blue stars each career goal has, the more relevant classes contributing to that career goal the user takes.

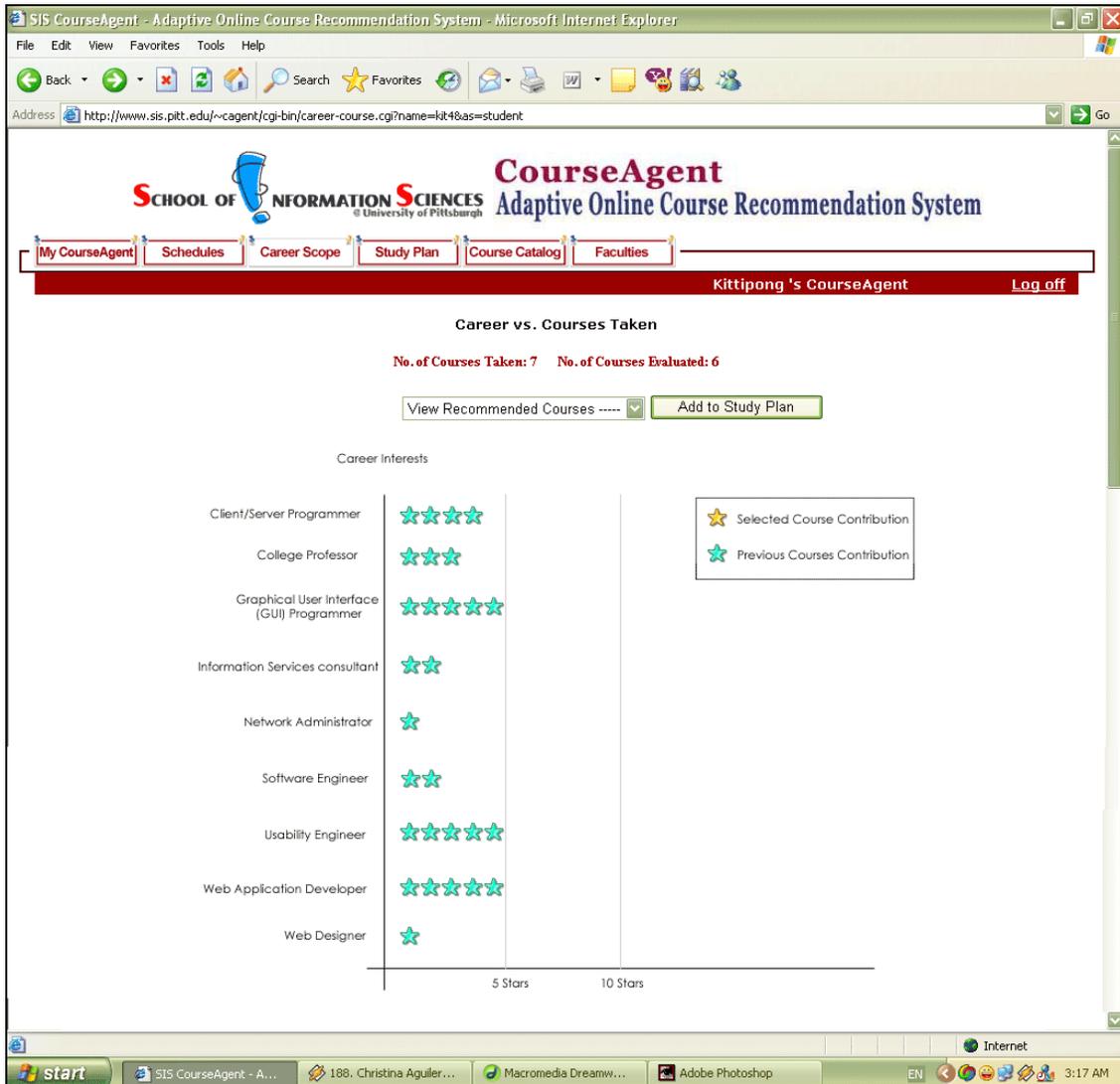


Figure 6: The initial state of the proposed interface

After the user selected any recommended course (the system have yet not added the course into the study plan), the system will change to another state shown in the image below. In this state, the yellow stars will appear in the page. The numbers of yellow stars indicate the level of relevance between the recommended class and career goals. Like blue starts, the more yellow stars each career goal has, the more contribution to that career goal the class would bring.

With this interface, users will realize which class they choose take in order to pursue their career goals by looking from the numbers of the yellow and blue stars.

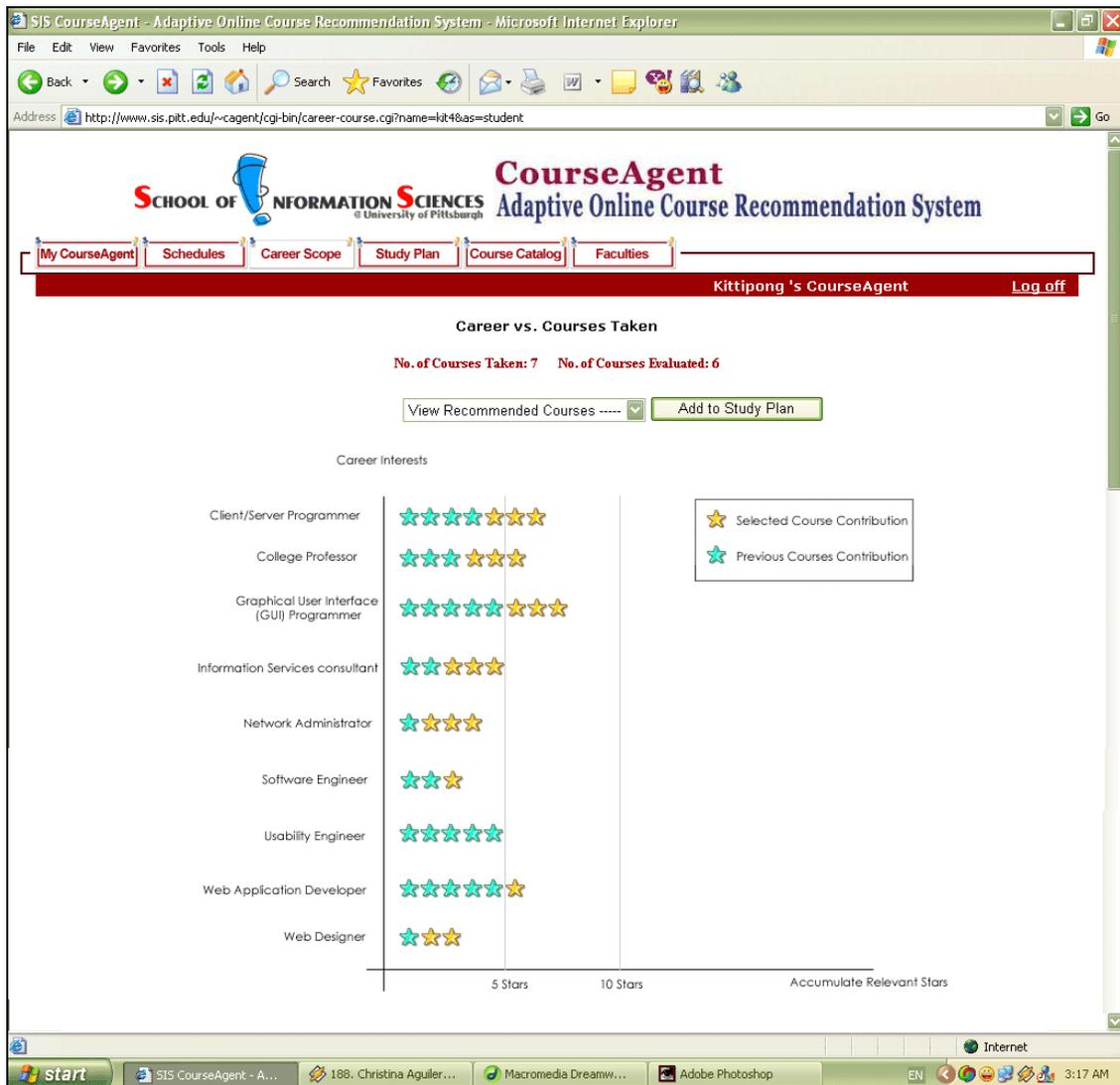


Figure 7: The next state of the proposed interface after user selects a recommended course

This proposed interface brings users more benefits that consist of:

- More simple and well organized
- Make the content concise and straightforward
- Provide enough information to support user activity

The Usability Study of the proposed interface (#2) for “Career Scope” Page in Course Agent System

User study & Task analysis for proposed interface #2

After we proposed the new interface to users, we attempt to evaluate the performance of the proposed interface over the current one. Therefore, we used the questionnaire technique again to assess proposed interface features. We asked them to answer the questionnaire after letting them play with the proposed interface. Since we have used this technique for the first evaluation, it is not difficult for us to compare the questionnaire results between the previous interface and the proposed one. As a consequence, we will know the drawbacks of the proposed interface that will allow us to enhance the better version of the interface in the appropriate way.

Besides, our team still observed users while they were playing with the proposed interface. We also asked their opinions and comments. With the think aloud method, we have realized few weak points of the proposed interface. Both the questionnaire results and the conclusion obtained from think aloud method are described later in the following two subjects that are questionnaire and thinking aloud protocol.

Questionnaire Analysis # 2

We used all the same questions in the previous questionnaire. We combined all the answers together and then obtained the following graph.

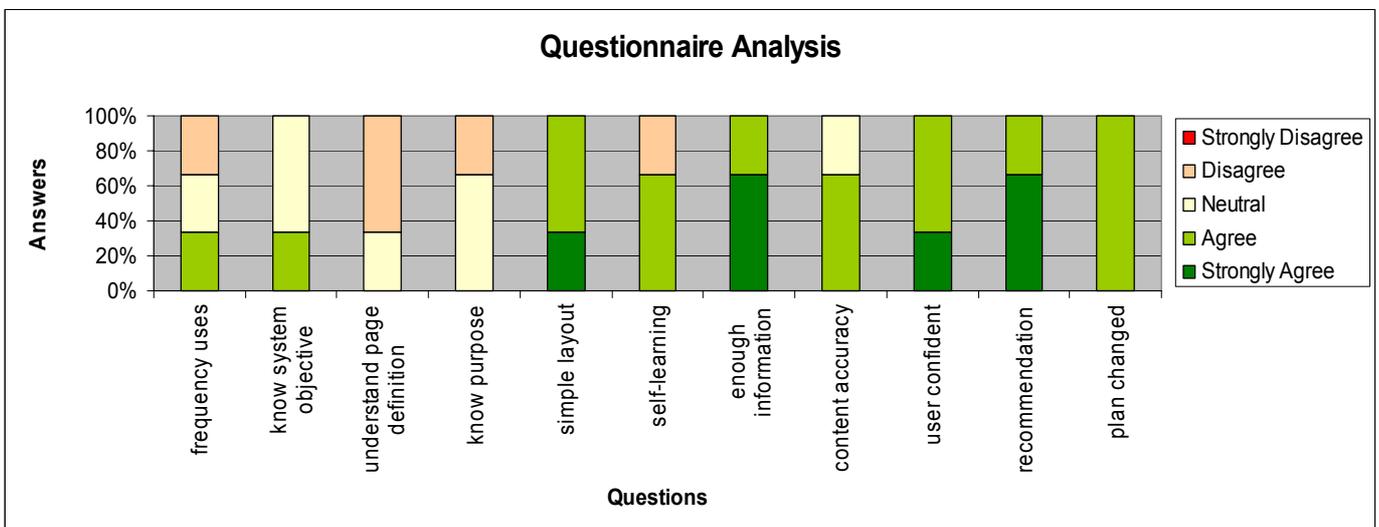


Figure 8: Questionnaire Analysis #2 (From Answer4 to Answer14 legend by “Strongly Disagree” to “Strongly Agree”)

Obviously, the answers mainly fall into only two choices, Agree and Strongly Agree. This result indicates that the proposed interface is better in supporting the users’ activities. Users somewhat satisfied the overall style and design of the interface, but not reached our expected level yet.

Once we review our proposed page design, users tend to prefer interface with simple and organized layout. At this point, we perceive that some components are needed to put in the interface while the others are not necessary. Furthermore, the information in

the proposed interface provides users with useful hints, which encourage users to discover how to use all the possible functions by themselves. Since the ‘Career Scope’ page display a graph with different star rating as a way to present levels of relevance between each career and a recommended class, it brings users more information confident in the page and system. It eventually convinces users to change their original study plan.

However, the title of this page, ‘Career Scope’, is still a problem for users to understand the purpose and definition of the page before looking inside the page. Since this objective of the page is to suggest user an appropriate course according to their career interests, the word ‘scope’ doesn’t tell any relationship between career interests and courses. Therefore, finding a proper page title would be more important for the future design. Moreover, users still needs more information to guide them how to use the page function correctly and efficiently. Perhaps, the interface needs to present some extra hints for supporting their activity better.

Questionnaire Conclusion # 2

According to the questionnaire analysis, we can list important features that the next version of the interface supposes to have. The feature list is shown as follow:

- Maintain simple and organized layout
- Provide more useful information
- Improved information accuracy
- Show hint for each critical point
- Change the page title to be more meaningful

Thinking Aloud Protocol # 2

Like we did before, we have cut only important parts of the thinking aloud protocols to model the next version of the interface. The table below shows our interpretation according to the dialog between user and our team member as well as the observation of user actions.

User’s actions and comments	Our interpretation
- User reads the career description of the career interest she chose. <i>U: This is much better because I am able to understand clearly what my career interest exactly signifies</i>	<ul style="list-style-type: none"> • Given useful information can increase user comprehension.
- User looks at the “Career Interests” chart below. <i>U: Hmm, I see stars here which reflect my career interests. Why are there two colors though? Blue and Yellow?</i> - User observes the legend for the stars in the chart. <i>U: Oh ok! So the yellow star signifies the selected course contribution and the blue star signifies previous courses contribution.</i>	<ul style="list-style-type: none"> • The page must show hint for all the critical points in order to fulfill users understanding • The visual display can make content concise and straightforward, which also enables user to learn faster

Note that U: User, Regular Font: User action, ***Bold & Italic Font***: User comment

Hierarchical Task Analysis (HTA) #2

The purpose of the ‘Career Scope’ page is to help user find recommended courses which will be beneficial to users’ career goals. For this analysis, we can break the user tasks down into five main subtasks. Then, two subtasks will be divided into another several subtasks. In order to use the page, user will perform these following steps:

1. Log in Course Agent System
2. Fill the information into MyCourseAgent page
 - 5.1 Add career goal in Career Interests page
 - 5.2 Select courses in Courses Taken page
3. go to ‘Career Scope’ page
4. Find appropriate courses and add to study plan
 - 4.1 Go to ‘All Career Interests’
 - 4.2 Pick a career interest
 - 4.3 Go to ‘View Recommended Courses’ combo box
 - 4.4 Pick a course
 - 4.5 Click ‘Add to Study Plan’ button
5. Log off from the system

plan 0: do 1-3-4-5. If there is no career goal in ‘Career Scope’ page, do 2-3-4-5.

plan 2: do 2.1-2.2.

plan 4: do 4.1-4.2-4.3-4.4-4.5.

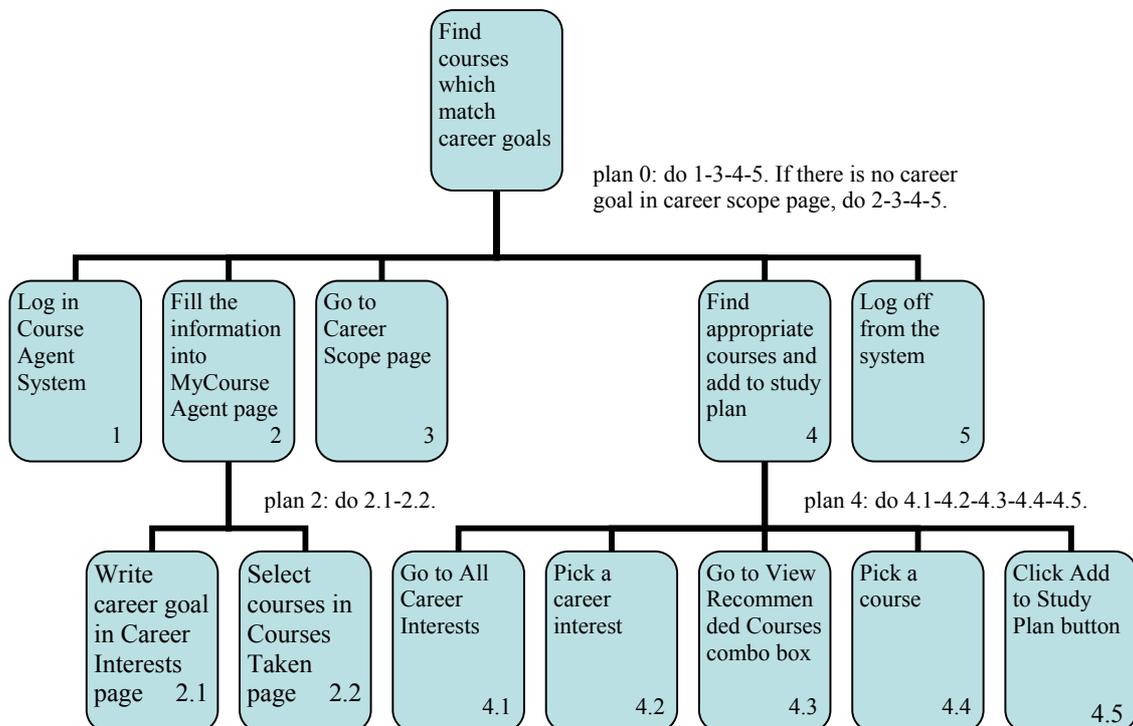


Figure 9: Task Hierarchy for Finding Appropriate Courses

The Latest Interface for “Career Scope” Page

Although we already satisfy with our interface for “Career Interests” page, we still want to develop a better interface for “Career Scope” page following what we have learned from user study that comprises questionnaire analysis #2 and thinking aloud protocol #2 because it cannot support user as well as it suppose to be due to lack of information.

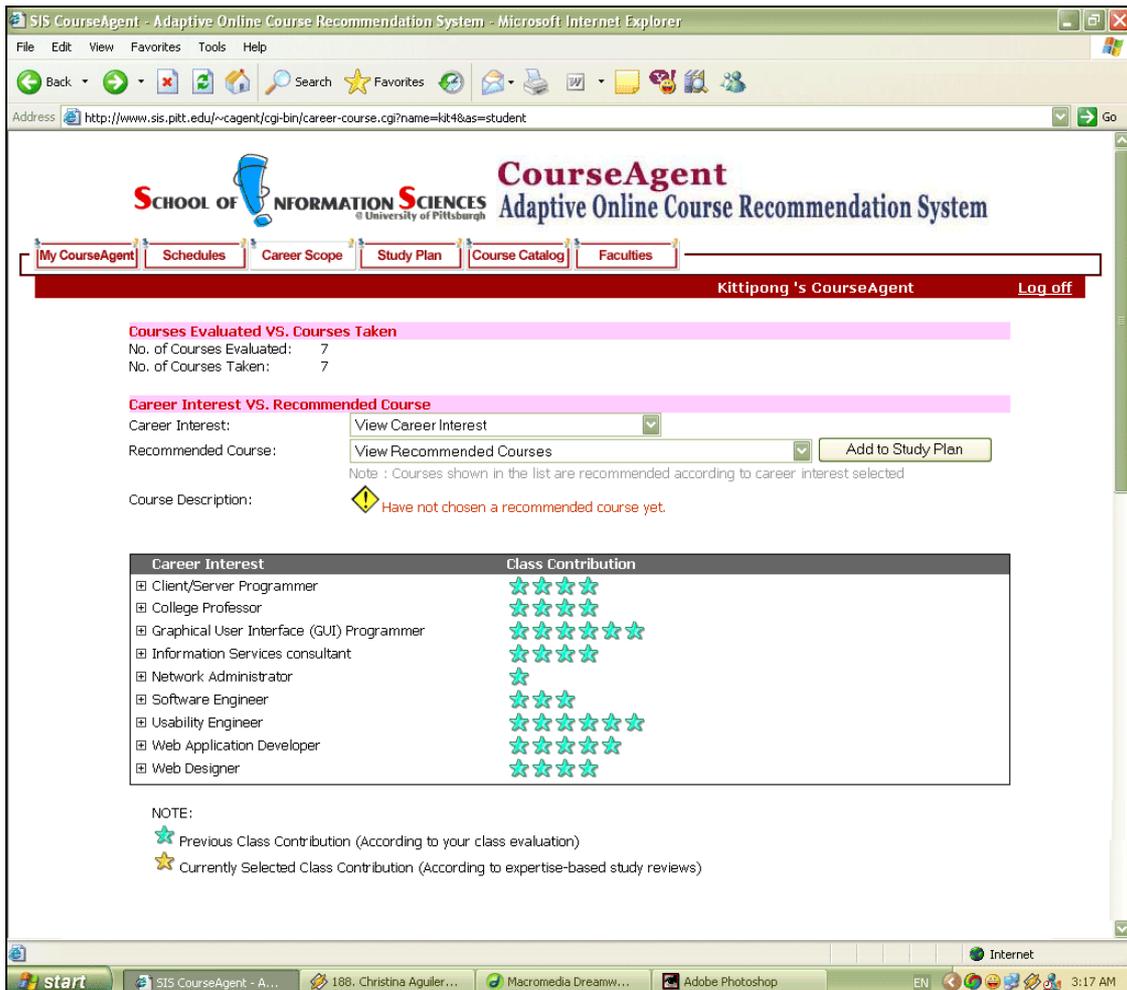


Figure 10: The latest interface for “Career Scope” page

For the latest interface for “Career Scope” page, we intend to maintain simple interface layout while add more useful recipes to the page such as a warning sign and hints in order to provide more useful information as suggested by the analysis. However, our design team had hard time to find a suitable compromise between making concise content and improving users’ comprehend because we want to add more description for the blue and yellow stars used as an indicators informing about the level of the class-career relevance into the page without adding more verbose content. It is due to the fact that the display size is not enough to present all necessary information in the same time. Thus, we use a technique that we called “Shrink and Expand” technique to make page look as simple as it appears in the previous proposed interface while it still contains

enough information which allows users to understand where the stars come from better than the previous interface. In addition, this latest interface bring users a rough idea about the purpose of the page since the page has only two main components that are “career interest” and “recommended course” drop-down list. Users can infer that it must be something between course and career. All in all, users know a course brings a user chances to succeed in their career interests somehow. We also include a solution’s message for every possible problem that might happen during playing with the interface to let user learn how to solve problems by themselves.

How Does the Latest Interface for “Career Scope” Page Work?

After a user entered into “career scope” page, the system presents an interface like the figure 10. If the user has already evaluated all the courses he has taken, it will not show any warning message. In contrast, it will show a warning message with yellow warning sign to catch user’s attention in case the user has evaluated only some courses.

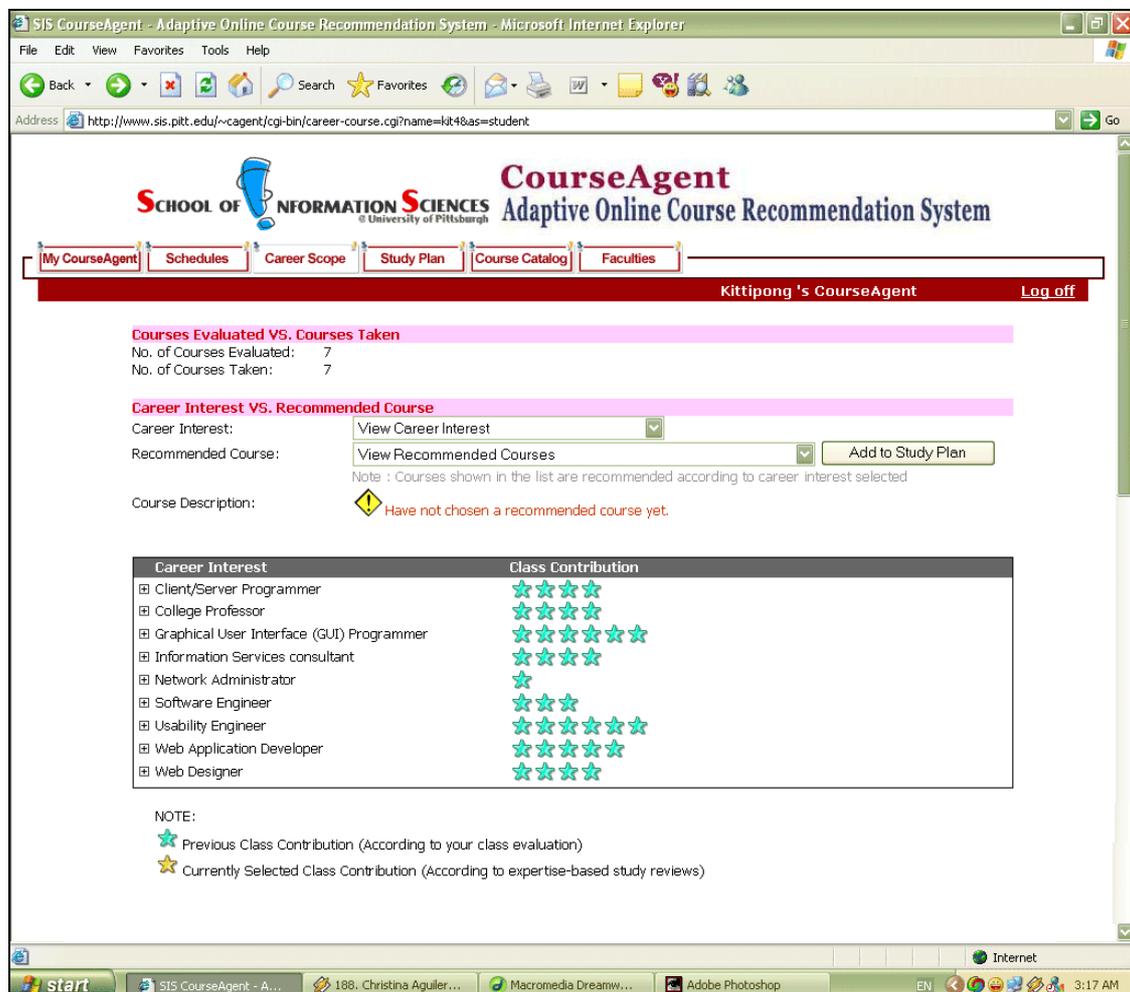


Figure 10: The initial state of the latest interface for “Career Scope” page

The extra feature adding on this latest interface is that users can see what previous classes contributes to each career goals and what level of relevance each previous class

brings. Users can expand this information by clicking at the “+” button in front of each career. After click the button, it will go to another state like figure 11. If they want to go back to the same state, they can click at “-” button in front of the career they just click.

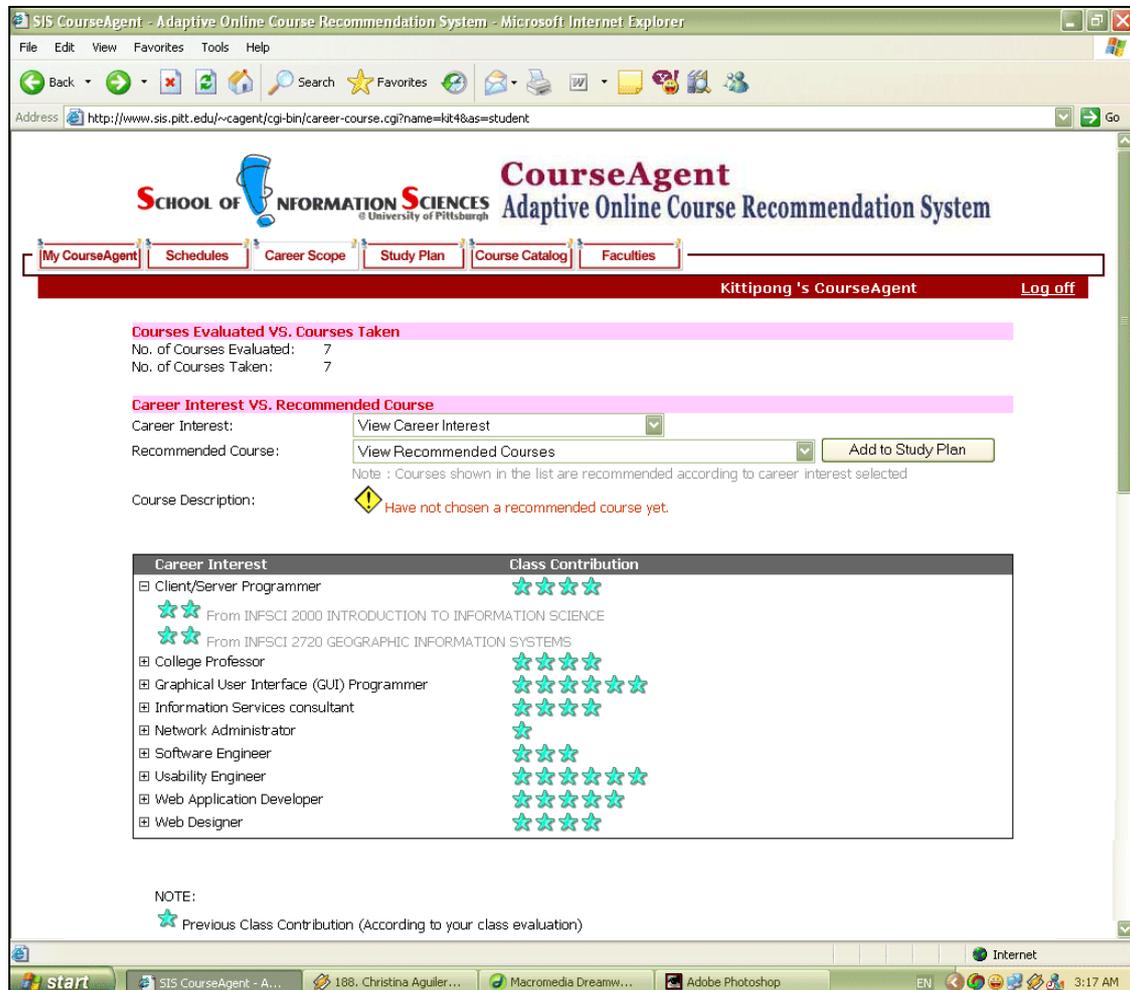


Figure 11: The state of the latest interface for “Career Scope” page that users click “+” button

Plus, users can either focus only one or all career interests by clicking at the career drop-down list shown in the figure 12 (focus on one career only) and in the figure 13 (focus on all the careers). After they click, interface will highlight the career with gray background color. Also, the recommended course will re-generate its list according to the career interest. For example, if users select “client/server programmer” for career interest, the recommended course list will contain only classes that involve with “client/server programmer” career. However, if users do not select any particular career, the recommended course list will contain all the classes except the classes users **have not taken** before only. As you have seen in the figure 12, this user has not evaluated all the courses he has taken. As a consequence, the warning message shows immediately and it provides the link to go back to evaluated the other classes.

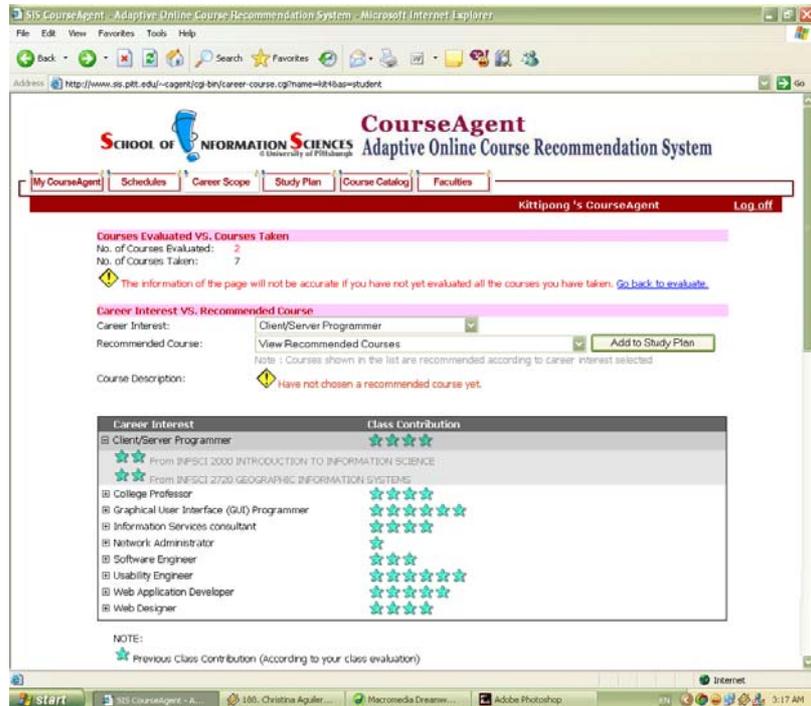


Figure 12: The state of the latest interface for “Career Scope” page when users select a particular career interest

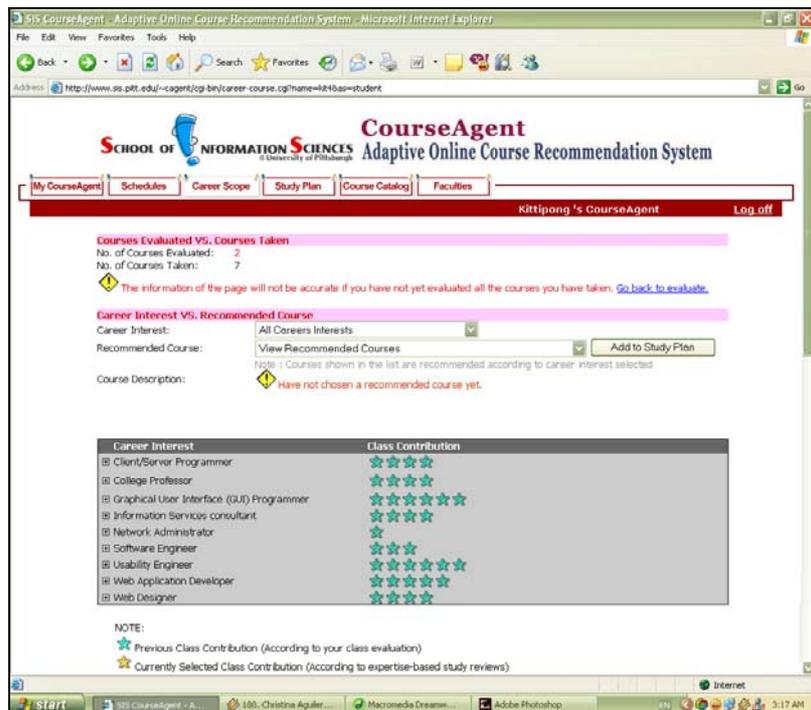


Figure 13: The state of the latest interface for “Career Scope” page when users select all career interests

Furthermore, when user has not chosen any recommended course yet, the interface shows warning message at the course description like the figure 13. However, if users already chose a recommended course (but it does not add to the study plan yet), it will show the course description instead.

Once users select any recommended course, the interface will present the relevance between that course and each of career goals by using a yellow star as an indicator of relevance level. Also, the recommended course list provides the name of the class, so users don't have to remember any class code at all.

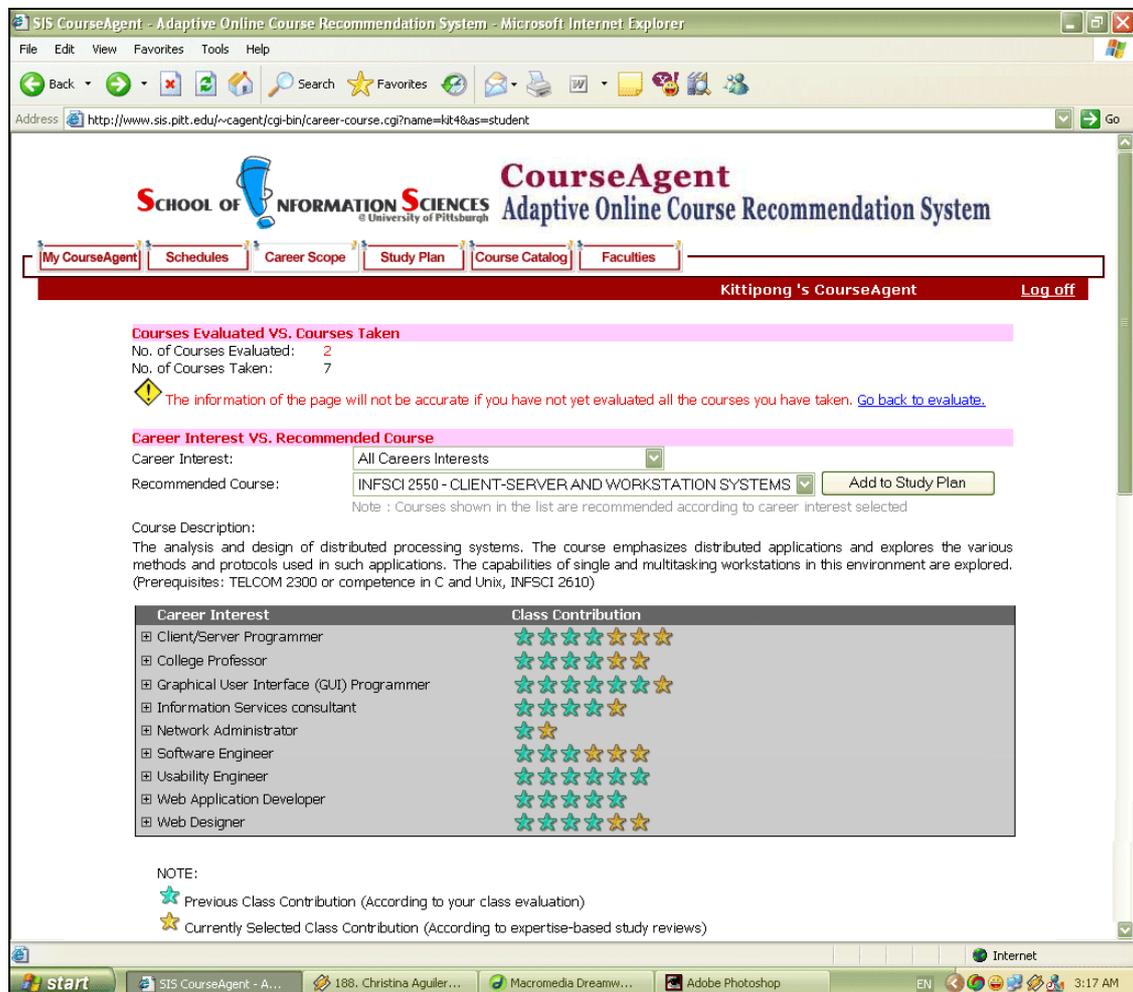


Figure 14: The state of the latest interface for "Career Scope" page when users select a recommended course

To conclude, this latest interface increases user performance, supports users' main activity and enriches user comprehension and encourages self-learning than ever since it contain various features that are:

- Very simple and well organized layout
- Concise and straightforward content
- Enough information to help user doing their main activity
- Interaction between user and interface in every action
- Provided a solution for possible problems
- Hints