Milestone 4: Heuristic Evaluation

December 5 2024

Procedure:

To address the issue of bugs in the prototype, a systematic inspection was conducted to see if this prototype complied with a set of usability heuristics. The selected set of heuristics was a combination of Nielsen's Ten Heuristics and Shneiderman's Eight Golden Rules of Interface Design. This procedure began with five different inspectors each spending an hour inspecting the interface. The goal was to catch around 75% of the usability errors. The inspection included performing major tasks using the interface, searching for edge cases, accessing accessibility and design. Following the inspections, a meeting between all inspectors was conducted to find the usability issues of greatest severity. The issues are organized in terms of functional/conceptual area and will be covered in depth below. This order makes the most sense as it mirrors the same order that each error would be encountered in while using the prototype. It also allows errors of similar elements to be grouped together, since they belong to the same page.

Planner Page:

The first error violates the Visibility of System Status heuristic from Nielsen's Heuristics. While the Requirements component displays the required courses the student needs to graduate, it does not show which requirements have been fulfilled (e.g., if a course has been completed or planned for the future). This is a moderately severe error, since it requires the user to remember what courses they have or have not completed. To address this issue, courses in the Requirements component could be colour coded, allowing the user to easily see if their requirements have been met for a specific course/section. Additionally, each sub category could display a percentage of units met, so users can measure their progress towards graduating.

The next error violates the Flexibility and Efficiency Heuristic from Nielsen's Heuristics. When a course is added to the Academic Planner for a specific year, there is no quick way to change the year the course belongs to. Currently, the user must remove the course from the planner, search for it again, and then choose the different year that corresponds to their goals. This is a severe error since it wastes a lot of time for a common mistake. To fix this issue, a future iteration of the prototype could have a feature to move or drag the course from one year in the planner to another.

Another issue found violates the Error Prevention heuristic from Nielsen's Heuristics. When a course is added to the shortlist, the shortlist information is maintained while switching between the Home Page and the Schedule Page. However, when navigating to the Planner page, all course shortlist information is lost. This is a very severe error because a user can easily lose all the work they've put into enrolling just for checking their planner. This error can be fixed by passing the state of selectedCourses (variable storing courses in the course shortlist) as props to

the Planner Page component from the Home Page upon navigation. An example of this error is shown below

Figure 1: Course shortlist displayed before navigating to the Planner Page

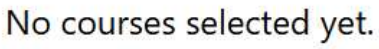

Figure 2: Course shortlist displayed after navigating to the Planner Page

Home Page:

The first problem found on the Home Page violates the Help and Documentation Heuristic. Although there is a help button, it has no functionality. New users are not offered any help at all, which violates the Golden Rule of Interface Design to design dialogue to yield closure. Additionally, there are no tooltips to help users. For example, if users wish to see the details of a selected course in the shortlist, they would have to look for the course again in the search box. Frequent users may not be affected by this issue, but it is a severe problem for new users. This can be fixed by adding functionality to the help button and adding tooltips to elements that need them, like the search filters.

Another issue found is that users cannot see their program requirements when adding courses to the shortlist. This severe problem violates the Recognition Rather than Recall Heuristic. The problem also does not follow Reduce Short-Term Memory Load as users would have difficulty remembering which courses they need. They have to navigate to the Planner Page to see their requirements then switch back to the Home Page to add the course. The severity of the problem is amplified when considering the issue of losing data when switching to the Planner Page. However, this can easily be solved by first solving the loss of data issue then adding a button that shows the requirements on the Home Page.

The Golden Rule of Easy Reversal of Actions is also violated on this page. If a course is deleted unintentionally from the shortlist the user must search for it again and add it back by repeating the steps they took to add it originally. While inconvenient, this issue is only of moderate severity. The steps to restore an accidentally deleted course should be intuitive to a user who managed to add it once. Additionally the layout of the page makes it unlikely for a user to delete a course unintentionally (the region of the screen containing the shortlist is not interacted with for anything other than removing courses, a wayward click is only likely in the case that a user

intended to delete a different course). This could be addressed in a new iteration by adding an undo button that can revert the shortlist to an earlier state.

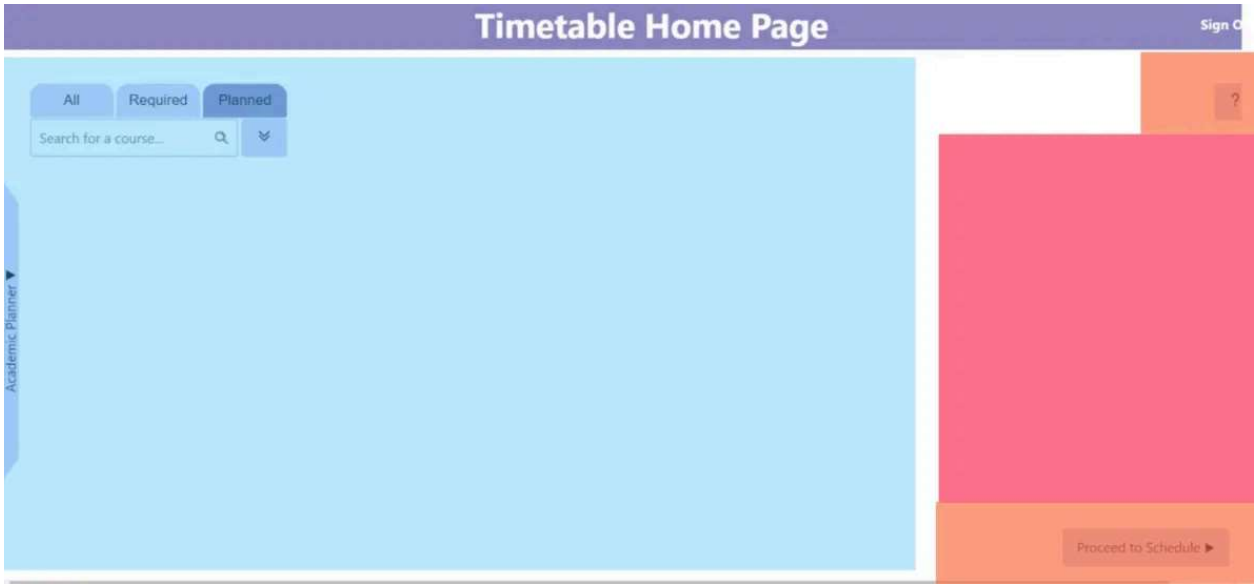

Figure 3: Regions of the home page delineated by coloured boxes, the blue zone is where a user's cursor is likely to be the majority of the time while searching for and adding courses. The red zone indicates where the shortlist is displayed and courses can be deleted. Orange zones represent other elements that a user may cross over the red zone to reach.

Schedule Page:

The first issue identified on the schedule page is the inability to hide or show specific courses when building a schedule. The user may have selected two courses with a time conflict, or a course which doesn't fit into their schedule, however there is no way to remove a course from view they no longer want to see. This is a violation of the User Control and Freedom Heuristic, as users should be able to quickly backtrack on choices made while using the interface. The issue is low severity, since for the most part it does not affect the user experience. This can be addressed in another iteration by adding a button next to each course in the shortlist which makes it appear or disappear from their weekly schedule.

Furthermore, another issue identified was a lack of informative feedback from the interface on this page. The system does not perform any checks for scheduling conflicts, if a course has already been completed before, or if it is full. Additionally, the system does not check if users are eligible to enroll in a course. This is a violation of the Help Users Recognize, Diagnose, and Recover from Errors Heuristic, since the system should design error messages to alert users of and guide them through recovering from errors. The issue is high severity, as unresolved errors can prevent the user from completing their main tasks. To address this issue, the interface should display a polite, easy to understand and constructive error message when a conflict arises during the schedule building process.

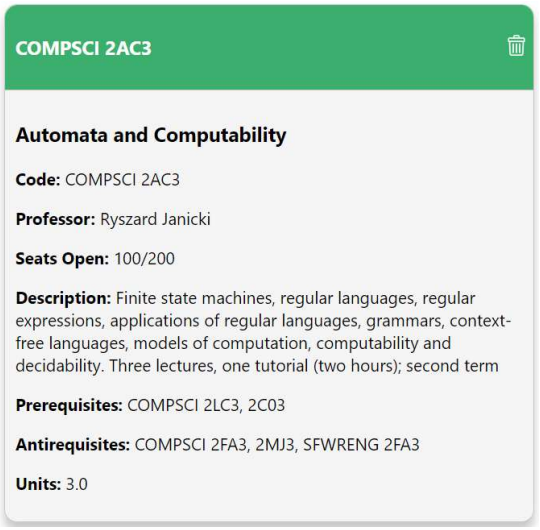

Figure 4: Details of a course with delete button, can be improved to hide/show on schedule and undo after deletion

Finally, an issue found violating one of Shneiderman's 8 Golden Rules of Interface Design occurs again. The schedule page does not follow Permit Easy Reversal of Actions when the user deletes a course from their shortlist. If a user wants to undo deleting a course, they have to go through many steps to reverse their action. This includes navigating to the Home Page, searching for the course, and adding it to their shortlist again. This is a severe issue as it is a common mistake which loses a lot of time. This issue can be resolved by prompting the issue to undo their action after deleting a course from their shortlist.

Appendix:

Jackson's Notes:

Visibility of system status
- Violated on planner page when student cannot see which requirements have been fulfilled
Consistency and standards
- Violated on planner page when adding a new year to the planner and it's column is a different size in the table
Help users recognize, diagnose, recover from errors
- Violated on the planner page when adding a course to the plan when its already been added (no error message)
Error prevention
- Violated when switching to planner page and all data is lost
Recognition rather than recall
- Violated on home page when weekly schedule is not visible while searching for new courses
Flexibility and efficiency of use
- Violated on planner and home page when courses must search for and be added one at a time rather than adding all required courses at once
- Also violated when removing courses, there is no clear all option
- Also violated when changing the year of a course in your plan, must remove and add again rather than dragging it to another column in the table
Aesthetic and minimalist design
- Violated in course details when a course has no antirequisites and unnecessary information is provided "Antirequisites: None"
Help and documentation
- Violated when no elements like buttons or tabs have tooltips to explain what they do

Alex's Notes:

Visibility of system status - Are users kept informed at all times?
- Users cannot see which requirements are satisfied in the Planner page
Match between system and real world - Is the UI language simple?
- yes
User control and freedom - Are there easy escapes from unexpected locations?
- Users cannot access the Schedule page from the Planner page and vice versa
- All courses in the shortlist are displayed in the Schedule, there should be a way to "hide" certain courses
Consistency and standards - Is performing similar action consistent?
- For the most part yes, however, the added courses are different sizes in the Planner vs the Schedule
- All years section has a legend but an individual year does not for the Planner
Help users recognize, diagnose, recover from errors - Are error messages helpful?
- When a user tries to add a course to the Planner or the course shortlist that has already been added, there is no error message saying that this course has already been added
- A user can add as many courses to the shortlist as they please, however only the first five will display in the Schedule. There is no error message saying maximum course number reached
Error prevention - Is it easy to make errors?

- Selected course information is lost after navigating to the Planner page

Recognition rather than recall - Are objects, actions and options always visible?

- It is unclear that the course shortlist information will be added to the Schedule, as the Schedule is on a different page
- Program Requirements are only visible on the Planner page

Flexibility and efficiency of use - Are there accelerators?

- The filters are accelerators but could be improved
- There is no way to add all planned courses for a certain year to the shortlist at once
- There is no way to remove all courses from the Planner at once, or remove all planned courses for a certain year at once
- There is no way to remove all courses from the shortlist at once

Aesthetic and minimalist design - Is any unnecessary and irrelevant information provided?

- no

Help and documentation - Is help provided that can be easily searched?

- There is a help button, however no way to search for certain components of the interface
- No information on hover displaying the functionality of a button

Jaskaran's Notes:

Nielsen's Heuristics:

Visibility of system status - Are users kept informed at all times?

- When users add courses to the plan, there is no visible confirmation message to show that the action has been completed successfully.

Match between system and real world - Is the UI language simple?

- The term "Add to Plan" may confuse users, as they may not immediately understand whether it refers to a tentative selection or a finalized course registration.

User control and freedom - Are there easy escapes from unexpected locations?

- There is no visible option for users to remove a course from the "Planned" section, limiting their ability to undo actions.

Consistency and standards - Is performing similar action consistent?

- The added courses are different sizes in the Planner page vs the Schedule page creating discrepancies in the format.

Help users recognize, diagnose, recover from errors - Are error messages helpful?

- If an already selected course is re-added, or if multiple courses have a time conflict, the system does not identify it as an error and lets the user proceed.

Error prevention - Is it easy to make errors?

- Upon navigating to the planner page the saved course information is lost.

Recognition rather than recall - Are objects, actions and options always visible?

-

Flexibility and efficiency of use - Are there accelerators?

- The lack of batch actions (e.g., adding multiple courses at once) can make planning slow for experienced users.

Aesthetic and minimalist design - Is any unnecessary and irrelevant information provided?

-

Help and documentation - Is help provided that can be easily searched?

- There is no clear guidance for using advanced features like filtering courses by requirements or customizing the planner view.
- The lack of onboarding for new users makes the interface less approachable.

Shneiderman's 8 Golden Rules of Interface Design:

Strive for consistency - Is the style of this element maintained across your site/app?
- inconsistent styling (e.g., font, layout) across all screens.

Enable frequent users to use shortcuts - Are there shortcuts available for your more experienced users?
- The lack of batch actions (e.g., adding multiple courses at once) can make planning slow for experienced users.

Offer informative feedback - Does the user know where they are at in the process?
- When there is an error (e.g., adding a course with scheduling conflicts), feedback is unclear and not actionable.

Design dialogue to yield closure - Does the user have to do any guessing here?
- Users might be unsure if a course was successfully added or not due to the absence of final confirmation as no prompt indicates the completion of the action.

Offer simple error handling - Have you done everything imaginable to prevent this error from happening on your end?
-

Permit easy reversal of actions - How many steps does the user have to take to reverse their actions?
- The interface lacks an "Undo" option for common actions, such as removing a course from the planner or discarding a draft schedule.
- Reversing actions requires the user to redo the process manually, which is time-consuming.

Support internal locus of control - Will the user feel in control at this specific touch point in your app?
-

Reduce short-term memory load - Are there enough visual cues here for the user to find the
functionality or item?
- Course details are scattered across multiple pages, forcing users to recall information.

Catherine's Notes:

Nielsen's Heuristics:

Visibility of system status - Are users kept informed at all times?
- No, other than the course shortlist and planned courses, data is not shared between pages

Match between system and real world - Is the UI language simple?
- yes

User control and freedom - Are there easy escapes from unexpected locations?
- Users are only able to access pages using the buttons, to go from planner to schedule, users must first go through the main page, cannot directly go from planner to schedule and vise versa

Consistency and standards - Is performing similar action consistent?
- Yes, most functionality is just pressing some button

Help users recognize, diagnose, recover from errors - Are error messages helpful?
- No error messages exist therefore users don't know that an error has/had been made

Error prevention - Is it easy to make errors?
- Planner page resets all data
Recognition rather than recall - Are objects, actions and options always visible?
-
Flexibility and efficiency of use - Are there accelerators?
- no
Aesthetic and minimalist design - Is any unnecessary and irrelevant information provided?
-
Help and documentation - Is help provided that can be easily searched?
- Help button exists, but doesn't function

Shneiderman's 8 Golden Rules of Interface Design:
Strive for consistency - Is the style of this element maintained across your site/app?
- Consistent colours, font
Enable frequent users to use shortcuts - Are there shortcuts available for your more experienced users?
- No, everyone must use the system the same way
- Offer informative feedback - Does the user know where they are at in the process?
no
Design dialogue to yield closure - Does the user have to do any guessing here?
- Yes, help button doesn't work
Offer simple error handling - Have you done everything imaginable to prevent this error from
happening on your end?
- no
Permit easy reversal of actions - How many steps does the user have to take to reverse their actions?
- If data is lost, user must start over
Support internal locus of control - Will the user feel in control at this specific touch point in your app?
-
Reduce short-term memory load - Are there enough visual cues here for the user to find the functionality or item?
- All buttons are labelled
- No visual cues to show course details

Sarah's Notes

Visibility of system status - Are users kept informed at all times?
- No system implemented in our prototype to visually differentiate courses that have already been enrolled in on schedule or shortlists (mostly since the final enroll button is non-functional, a full implementation would need visual cues for courses that a user is currently enrolled in)
Match between system and real world - Is the UI language simple?
- I think so
User control and freedom - Are there easy escapes from unexpected locations?

- If a user adds a course to the wrong year in the planner accidentally it has to be removed and re-added, currently no way to move a course year to year

Consistency and standards - Is performing similar action consistent?

- The main search and planning search function in the same way
- The shortlists on both the main search page and the scheduling page use the same ui elements, within the planner the element is similar although the remove option not always being visible may cause problems

Help users recognize, diagnose, recover from errors - Are error messages helpful?

- No error messages currently implemented

Error prevention - Is it easy to make errors?

- You do have to confirm enrollment on a second page which is good.
- While adding courses to the planner you may unintentionally add a course to the wrong year as the year selection and planner display tabs are not necessarily showing the same year / matched up at a given time. Some kind of highlighting or syncing might be helpful

Recognition rather than recall - Are objects, actions and options always visible?

- no, shortlist on search page is not made obvious until at least one course is added
- Removing a course from the planner is not obviously possible without moving the mouse over

Flexibility and efficiency of use - Are there accelerators?

- Yeah arguably, the planned tab on search

Aesthetic and minimalist design - Is any unnecessary and irrelevant information provided?

- Required courses display on planning page a bit cluttered, should possibly be integrated into “required” tab of the search module somehow

Help and documentation - Is help provided that can be easily searched?

- Help button is present but currently nonfunctional.