Usability Evaluation

Website evaluated: Testudo: https://www.testudo.umd.edu/

Sanjana Danait

Introduction

Chosen Website

I chose to evaluate University of Maryland's Testudo website. This website is run by the UMD's Office of the Registrar and allows users to perform a wide variety of tasks- from checking schedule of classes and registering for courses to ordering transcripts and updating personal information. Having used this interface frequently and being frustrated about it, I realized that the interface had various usability issues that went beyond the obviously outdated look and feel of the website. Because it is a university website that caters to a large population, I wanted to know if other users were also facing the same problems and try to understand the causes behind this frustration. Specifically, I wanted to determine if the navigation was confusing if the structural layout of the page is intuitive for the users and if the design patterns and language are consistent across the interface.

Typical Users

Typical users of the Testudo website would include current students, faculty, alumni and parents of students. However, out of all the most frequent users would be the current students. The age group of users would be 18 and above. Computing experience of users will vary by age and profession, with students and younger faculty likely being more tech savvy than senior faculty, older alumni, and parents. Most of these users except some parents would have completed their higher education. Job responsibilities of users may vary. Users are most likely to be using a desktop computer or possibly a tablet to access the site. I believe that users would access testudo from their mobile phones very rarely and only if required urgently.

Area of evaluation

Testudo users would use the website for a variety of reasons but primarily as a central hub to locate information on the academic calendar and schedule of classes and perform tasks such as course registration and transcript ordering. Keeping this in mind, the tasks for the heuristic evaluation are designed to evaluate what problems users face while performing these common actions. These tasks include finding courses to register for,

registering & dropping a course, checking on waitlisted courses, checking student schedule, updating student profile details. The task goals were to evaluate if users could quickly and effectively find the information, they were interested in. It is highly important that users find registration and dropping policies and can perform those actions without any issues since course registration has financial implications.

Part 1: Heuristic Evaluation

1. Method

I decided to use Jakob Neilson's 10 Usability Heuristics.

a. Visibility of system status

b. Match between system and the real world

c. User control and freedom

d. Consistency and standards

e.   Error prevention

f. Recognition rather than recall

g. Flexibility and efficiency of use

h. Aesthetic and minimalist design

i. Help users recognize, diagnose, and recover from errors

j. Help and documentation

I found these heuristics to be the most relevant to studying the usability of a Testudo because they specifically address how error prevention, consistency and recognition rather than recall should be evaluated and implemented. My selected interface had several issues that were related to these heuristics and hence evaluating using Nielsen's heuristics felt more appropriate to me.

2. Results

a. **Visibility of System Status**

Observations:

The Testudo website is in line with Nielsen's heuristic of visibility of system status in some cases– for example, on updating personal information, the system provides a success message that the new information has been saved.

However, in some cases it does not provide such feedback. During course registration once the user registers or drops a course the system doesn't provide a notification or success message that the specific update has been made. The only way for the user to understand is to check the list of courses again and see if the new one has been added or the previous one has been dropped. This might not create a problem when users have only 2 or 3 courses registered at a time, however it could create confusion and frustration

for users who register for more than 5-6 courses at a time. It would be time consuming to check the list and ensure that they registered for or dropped the right course.
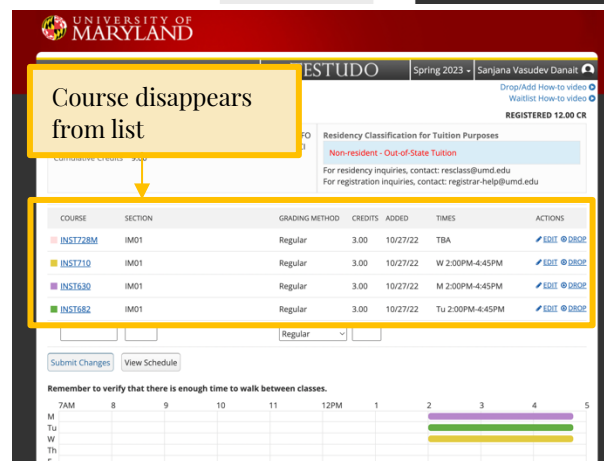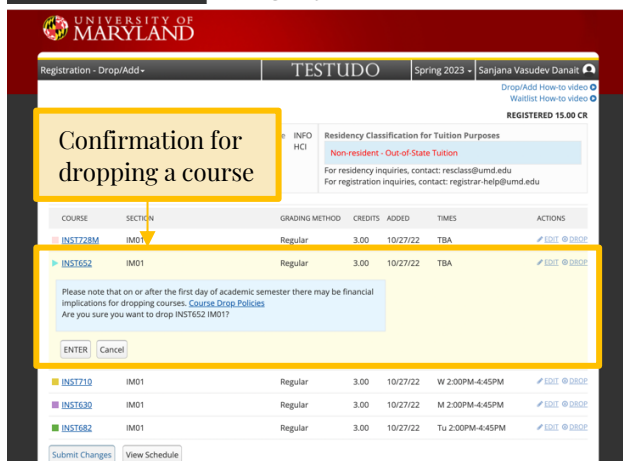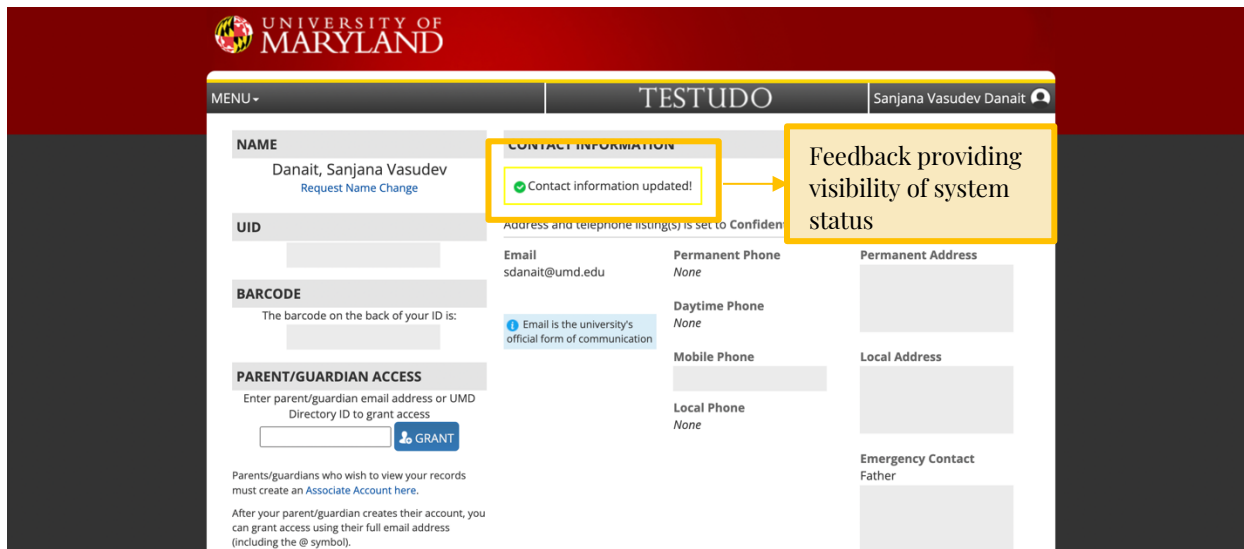
Suggestions:

On registering for or dropping a course, system should provide a success notification on top of the page so that it is clearly visible which course was added/dropped. By providing this visibility of system status, users can be assured that they have performed the right task and they won't spend time in cross-checking the course list.

b. User control and freedom/Error Prevention/Help users recognize, diagnose, and recover from errors

Observations:

As mentioned above in one example, the Testudo interface does provide a confirmation panel and a way to cancel the action of dropping a course. This gives the user control and ensures the user that the next time they accidently click on the drop button, they will have the control and freedom to "undo" that action.

Similarly, while updating personal and contact information, the system asks a confirmation after clicking on the "update" button. This ensures that users can cancel their changes if they input any wrong information.

Another example I noticed was that if the user tries to register for a course that is already in their list, then the system generates an error message and provides the exact information on what is causing the error.
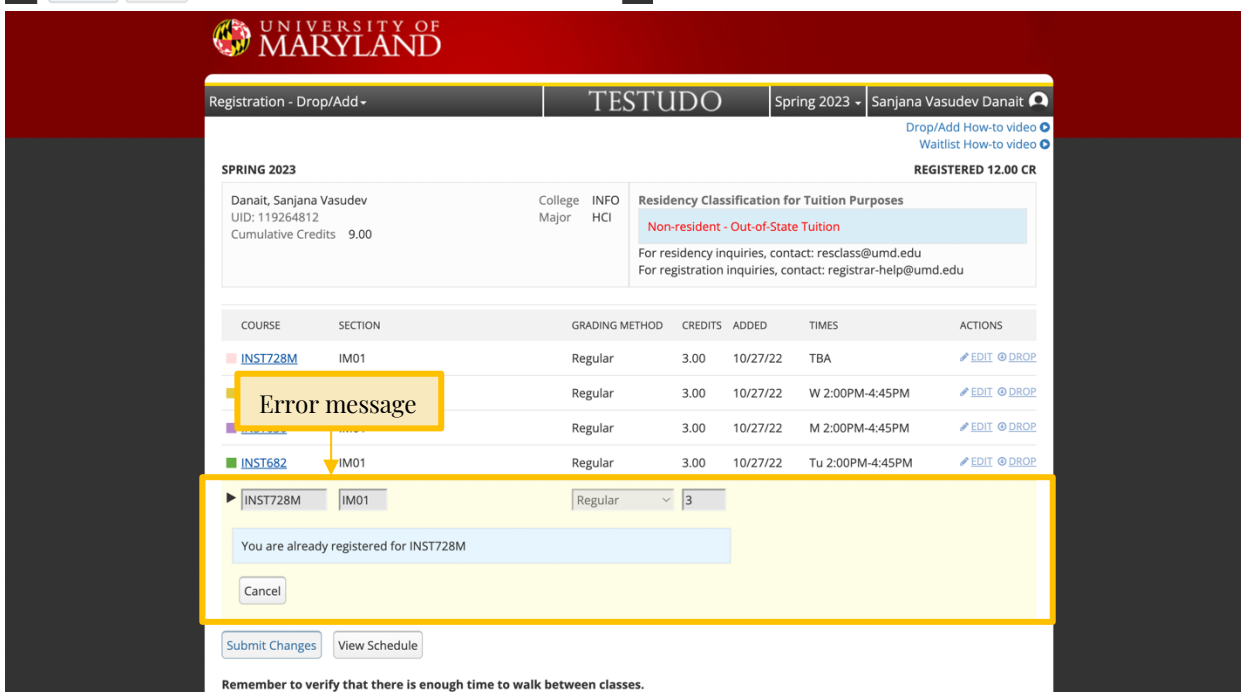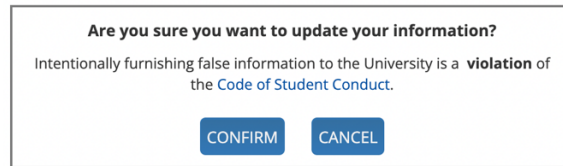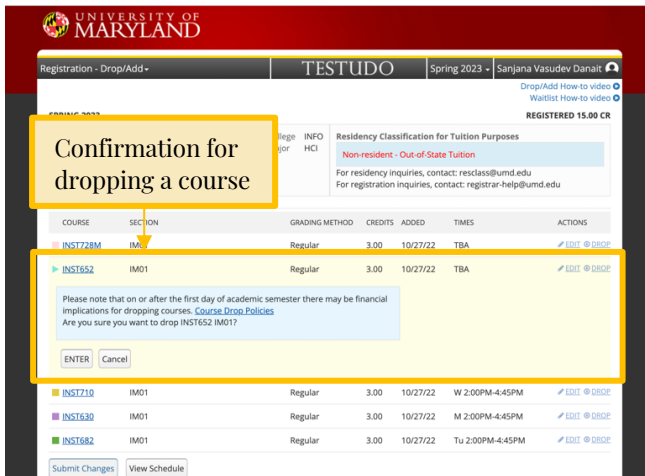
Suggestions:

Although the interface provides an error message if the user registers for the same course again, the message is provided after all the details of the course have been filled in. This can be improved if the message is triggered right after entering the course number. This will ensure that users' will be informed earlier and their time does not get wasted in entering unnecessary information.

The next better suggestion would be to completely change the way the current registration interface works, to make sure there is no possibility for errors and to ensure

that users don't have to recall information. I will elaborate on this suggestion in the 'Recognition rather than Recall' heuristic.

c. Consistency and standards/Match between System and the Real World

Observations:
One of the first things I noticed on the Testudo website is that it was missing consistency and standards. The homepage has a top navigation bar which is associated to the UMD website and all the links lead to external UMD webpages, however it just has a header bar and does not have a standard top navigation bar for users to navigate easily within the Testudo website. Moreover, what I noticed was that some pages on Testudo replaced the header bar with a navigation bar that segregated information based on user types– current students, alumni, faculty and parents. Further, when users are on any webpage to perform actions such as registration, drop/add courses or updating personal details, the header and navigation bar changes completely.

Another inconsistent element on the testudo website is the left navigation panel titled "Find it Fast". Although this navigation panel does appear on every page within testudo, the content within it keeps changing depending on which webpage the user is on. This makes the element inconsistent and could potentially confuse the users.

Lastly, the website doesn't follow the standard real-world expectations of a header and footer. As a standard, usually address and contact information is provided in footers whereas, on testudo this information is provided in the header itself. Thus, all these examples show that the Testudo website fails Nielsen's 'Consistency and Standards' as well as 'Match between System and the Real World' heuristic.
Testudo website fails Nielsen's 'Consistency and Standards' as well as 'Match between System and the Real World' heuristic.

Header

Top navigation bar associated with UMD and leads to external webpages

Address and Contact information provided in the header

"Find it Fast" Navigation panel on the homepage

UNIVERSITY OF MARYLAND   ADMISSIONS   COLLEGES & SCHOOLS   NEWS   EVENTS   MAKE A GIFT

OFFICE *of the* REGISTRAR

Office Hours: Monday - Friday, 8:00am - 5:00pm
First Floor, Clarence M. Mitchell Building
7999 Regents Drive, College Park, Maryland 20742

TESTUDO
Current Students & Alumni

INTERACTIVE WEB SERVICES

Schedule Of Classes   Final Exams

FIND IT FAST

Academic Deadlines

Course Feedback Reports and Submissions

Final Exam Information

Financial Aid

Former Students Access

Honor Pledge

Parent Access

Register to Vote

Student Financials

Transfer Credit

Tutoring Services

Web Accessibility

Change Address / E-mail   Student Schedule

Degree Audit   Unofficial Transcript

Grant/Remove Parent Access   Waitlist Check-In

Registration (Drop/Add)

The following interactive web services are available 24 hours

Deactivate ID Card   Graduation Application & Diploma Status

Diploma Remake Request   Institute of Applied Agriculture Transcripts

Enrollment Certification Request & Status   Schedule of Classes

GPA Calculator   Transcript Ordering

Grades   **Venus** - Schedule Builder

Header bar replaced with a navigation bar

"Find it Fast" Navigation panel on a different page with different

UNIVERSITY OF MARYLAND   ADMISSIONS   COLLEGES & SCHOOLS   NEWS   EVENTS   MAKE A GIFT

OFFICE *of the* REGISTRAR

First Floor, Clarence M. Mitchell, Jr. Building
7999 Regents Drive, College Park, Maryland 20742
p. 301-314-8240 | f. 301-314-9568 | registrar-help@umd.edu

CURRENT STUDENTS / FORMER STUDENTS / PARENTS / FACULTY & STAFF / FAQS
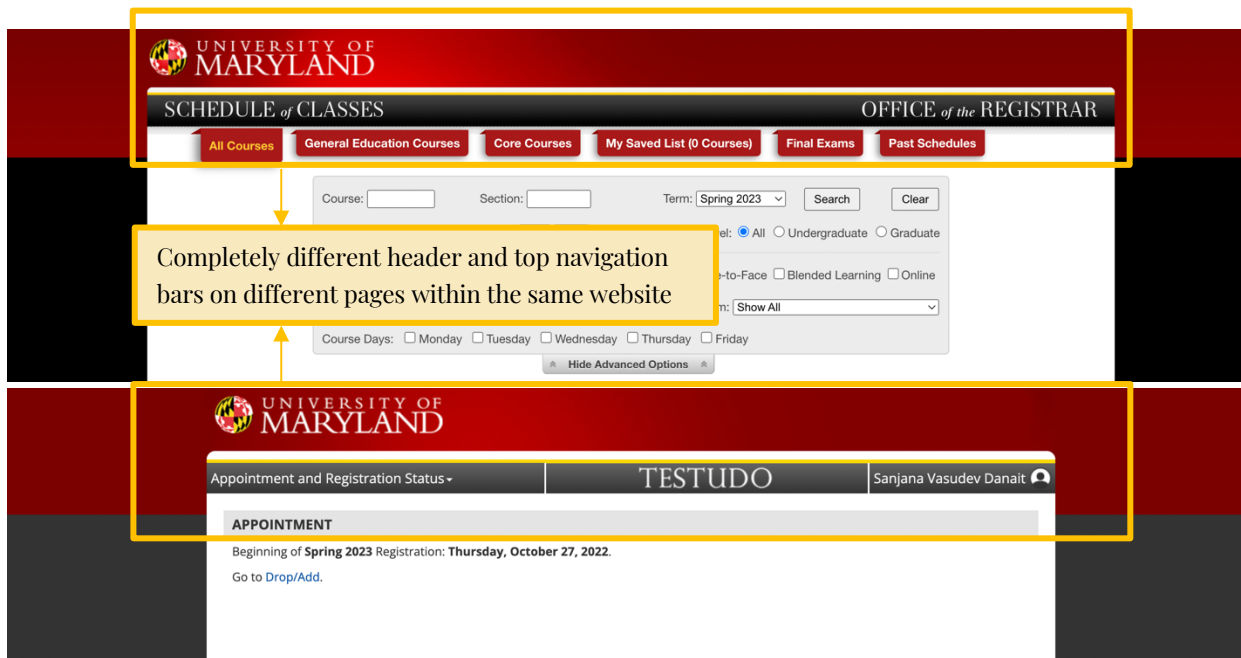
UNIVERSITY CALENDARS AND DEADLINES

The University Academic Calendar

Academic Deadlines

- Fall & Spring Semesters
- 12 Week Term
- Summer Term
- Winter Term

FIND IT FAST

Academic Calendar

Academic Deadlines

Athletics & Tickets

Billing & Tuition

Commencement

Dining Services

Education Abroad

Extended Studies

Completely different header and top navigation bars on different pages within the same website

Suggestions:

The navigation bar that segregates information based on the user type should be consistently displayed across all webpages within Testudo as it would create consistency while also making users tasks of finding relevant information much easier and less time consuming.

Secondly, the content within the "Find it Fast" panel should be kept consistent on all pages to avoid user confusion. Or, if the purpose of the inconsistent content is to provide links that relate to the current webpage the user is on, then the title of the "Find it Fast" panel should be changed to "Related Links" or something similar. This would ensure that the user understands why the content is changing on each webpage and would further also encourage them to visit those pages since they would know that the content is related to what they're looking for.

d. Recognition rather than recall

Observations:

One of the most frustrating parts about the Testudo website comes to light when users have to browse through courses and register for them. The website is structured in a way where 'Schedule of classes' is a separate page and 'Registration, drop/add' is a separate page. Thus, this forces the user to remember information from one part of the interface to another which is a tedious and frustrating process. Moreover, users are expected to

input all the information about course number, credits and section manually while adding courses and while doing that the course name is not displayed anywhere on the registration page. This increases the information that users have to remember and also increases chances for errors, as highlighted above in one example- it opens the possibility for a user trying to register for the same course again.

Additionally, even on the student schedule page, the courses are mentioned only by their number and the course name is not provided anywhere. This increases the cognitive load as new students have to keep remembering which number stands for which course and could easily end up getting confused and making errors.

Suggestions:

One suggestion would be to include a "add/drop" button right next to the sections in the course list card on the 'Schedule of classes' page. Another suggestion would be to provide a searchable text field/dropdown on the registration page that allows searching for the course number or name. Once the user selects the course from that list, the rest of the information like section and credits should be auto filled from the database and shown on the interface. There should also be an added column that shows the course name. These approaches would ensure that users do not have to remember large amounts of information and their registration process occurs in a fast, easy, and error-free manner.

INST   Information Studies   Hide All Sections

INST600   **Foundations for Librarians and Information Professionals**   ▸ Syllabus Repository (0)   ☆
Credits: 3   Grading Method: Regular, Audit

Restriction: Permission of INFO-College of Information Studies.
Credit only granted for: LBSC791 or INST600.
Formerly: LBSC791.

An introduction to the field of library and information science (LIS), its history, and future direction that provides students with an understanding and appreciation of the nature and functions of the profession(s) they have entered. The focus is on core concepts underlying the LIS discipline, with particular emphasis on professional ethics/values, diversity, equity, inclusion and accessibility (DEIA), and the ways in which technology has shaped and continues to shape the field.

▾ Hide Sections   **All Sections**   Face-to-Face   💻 Online

| IM01 | Ursula Gorham-Oscilowski W 6:00pm - 8:45pm | Seats (Total: 40, **Open: 32**, Waitlist: 0) HBK 0109 | ☆ 📚 | **Add** |
| IM02 | Ryan O'Grady Class time/details on ELMS | Seats (Total: 40, **Open: 17**, Waitlist: 0) | ☆ 📚 | **Add** |

> Add/Drop button added on the schedule of classes page itself, so users don't have to go back and forth between two different

INST604   **Introduction to Archives and Digital Curation**   ▸ Syllabus Repository (1)   ☆
Credits: 3   Grading Method: Regular, Aud...

Restriction: Permission of INFO-College of Information Studies.
Credit only granted for: LBSC604 or LBSC605.

Overview of the principles, practices, and applications in the archival and digital curation fields.

▾ Hide Sections   💻 Online

| IM01 | Diana Marsh Class time/details on ELMS | Seats (Total: 30, **Open: 9**, Waitlist: 0) ONLINE | ☆ 📚 | **Drop** |

> Add a column for course name

For registration inquiries, contact: registrar-help@umd.edu

COURSE	SECTION	COURSE NAME	GRADING METHOD	CREDITS	ADDED	TIMES	ACTIONS
■ INFM700 ☰	IM01	Lorem Ipsum 1	Regular	3.00	08/12/22	M 4:45PM-7:45PM	✎ EDIT ⊘ DROP
■ INST711 ☰	IM01	Lorem Ipsum 2	Regular	3.00	07/14/22	Tu 2:00PM-4:45PM	✎ EDIT ⊘ DROP
■ INST631 ☰	IM01	Lorem Ipsum 3	Regular	3.00	05/07/22	Tu 6:00PM-8:45PM	✎ EDIT ⊘ DROP

Search course number/name...

INST123 Lorem Ipsum 1
INST234 Lorem Ipsum 2
INST345 Lorem Ipsum 3
INST456 Lorem Ipsum 4
INST567 Lorem Ipsum 5

> Search field that helps to select a course and will then autofill other details like credits and section

e. Flexibility and efficiency of use

Observations:

Testudo does have some functionalities that provide flexibility and efficiency of use to users. On the 'Schedule of classes' page, the interface provides filtering options that

users can use to narrow down their search and save their time. It gives the ability to search for specific department courses, the semester, section, whether users are searching for graduate or undergraduate course and a lot more filters.

However, users almost always want to check schedules for a specific location, department or credit level and every time they visit the schedule page, they have to select the same filters again and again. This sometimes creates user frustration and reduces interface efficiency.

Testudo also allows users to "save" courses and has a 'Saved courses' tab that ensures users can efficiently just check timings and other details of a few select courses instead of going through an entire course list.

Suggestions:

One way to further increase efficiency and flexibility of the Testudo interface is to add a "save filer preferences" feature in the filters section on 'Schedule of Classes'. This will

ensure that users save time and don't have to select the same filters every time they visit the page.

f. Aesthetic and minimalist design

Observations:

The testudo homepage offers way too many options and links which could be overwhelming and confusing for new as well as repeated users. These links are listed in bunches and are not well segregated which can cause further cognitive overload. The page also has multiple colors and doesn't use primary or action colors to emphasize and focus on features. The interface does highlight two buttons but doesn't repeat the similar button language on other pages within the website.
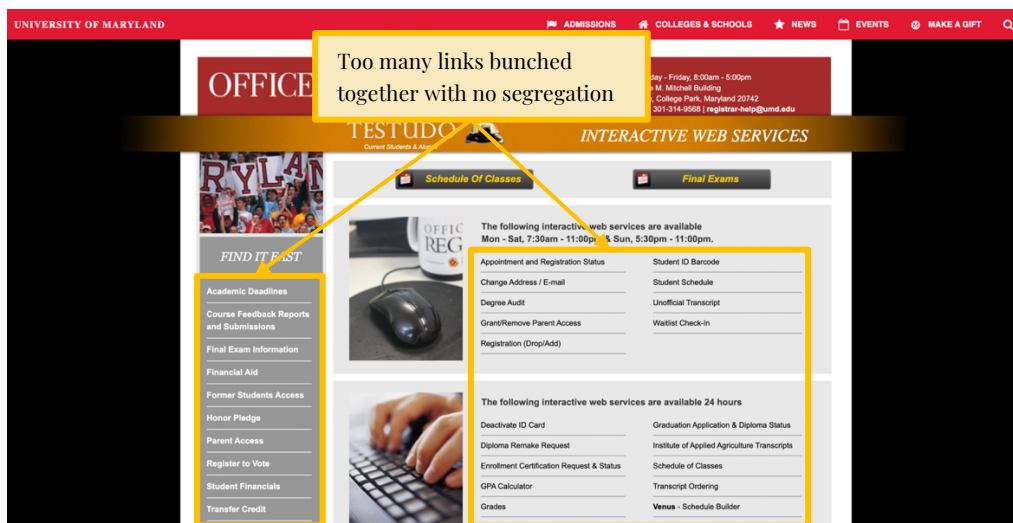
Suggestions:

As mentioned in a previous suggestion, the page should have a navigation bar that segregates information and links based on the users- current students, alumni, parents & faculty. The 'schedule of classes' and 'final exams' buttons should be visible only under the 'current students' section. The rest of the links can then further follow the segregation based on the hours when the services are available.
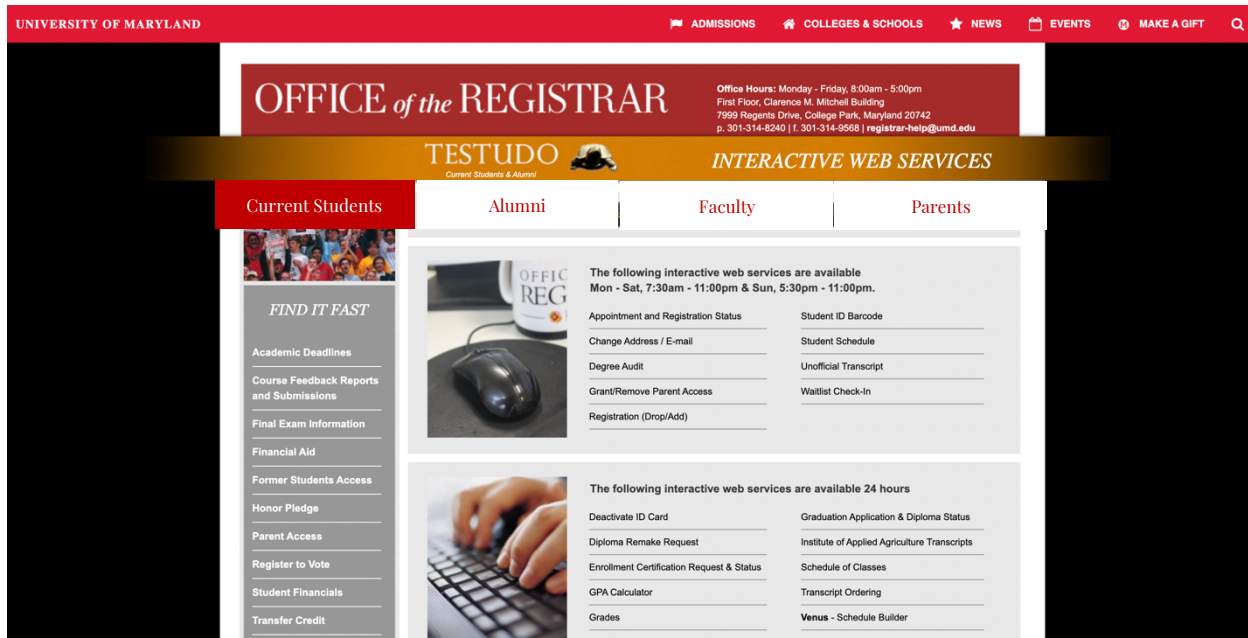
g. Help and documentation

Observations:

Testudo does provide certain level of help and documentation specifically on the registration drop/add page. It provides links to videos that explain the process in detail. The website also has a footer panel that provides links to help and documentation on various services available at UMD.

Footer with links leading to external help/documentation pages

Links to help videos

Help videos that open in new tabs

Part 2: Usability Study

1. Methods

1.1 Procedures

I conducted a moderated remote usability test of the Testudo website. I used three tools during this usability evaluation– the video conferencing tool Zoom to record the audio and video of each session, my phone's built-in stopwatch feature to record the time on task metric and pen & paper to take observation notes. I made sure that all participants were informed in advance to have the Zoom tool installed on their desktops. I made a list of 10 tasks that the users needed to complete for the evaluation, and I encouraged them to also think out loud while performing each task. For each task, I noted the task and time performance and observations for each participant.

1.2 Recruitment

All the participants were students at the University of Maryland, out of which 7 were graduate students and 1 was a PhD student. These users were selected because I was testing UMD's Testudo website, and these users would be using the website on a regular basis. They had a variety of academic and professional backgrounds, personal interests, and computer skills. Before starting the study, I provided a consent form to each participant and also made it clear that this study was for education purposes and no monetary help would be given in return.

1.3 Participants

I recruited a total of 8 participants, 2 for the pilot study and 6 for the main usability study. Out of them, 7 were graduate students and 1 was a PhD student. The participants were in the age group 22–28 and were from a variety of fields ranging from Data Science to English literature PhD. 6 of the 8 participants were also working in assistantship positions or hourly jobs on campus, while 2 were not working. All the participants used computers on a daily basis and can be considered to have 'expert' technical experience. In the previous assignment, I had mentioned that Testudo's typical users would be current students, former students, faculty, and alumni. However, since current students are the major users of this website, in this usability study all the participants recruited were current UMD students. Hence the recruited participants do not represent all those mentioned in the previous assignment.

Table 1: Participant Demographics

PID OR Pseudonym	Age	Gender	Education	Job	Technical Experience	Date of Eval
Pilot: User A	25	Female	HCI Grad student at UMD	N/A	Expert	11/15/2022
Pilot: User B	24	Male	MSMA Grad student at UMD	Student Ambassador	Expert	11/15/2022
Main: P1	27	Male	HCI Grad student at UMD	Graduate Assistant	Expert	11/16/2022
Main: P2	26	Female	HCI Grad student at UMD	N/A	Expert	11/16/2022
Main: P3	22	Female	Data Science Grad student at UMD	Research Assistant	Expert	11/17/2022
Main: P4	28	Male	Data Science Grad student at UMD	Research Assistant	Expert	11/17/2022
Main: P5	23	Female	English Literature PhD student at UMD	Research Assistant	Expert	11/17/2022
Main: P6	24	Female	MIM Graduate student at UMD	Grader	Expert	11/17/2022

2. Usability Study Tasks

2.1 Pilot Study

How was the task list tested before it was utilized?
After writing the initial task list, I conducted a pilot study with 2 users. Through this study, I got appropriate feedback and insights on how the wording of a question could be changed or how some tasks could be framed in a way for users to understand it better without getting confused. Following are examples of some initial tasks and how they were changed after the pilot study-

1. According to the INST711 class timing, what could be the estimated dates and times of the final exam for INST711 for the Spring 2023 semester?
● In this task, users were confused due to the word "estimate" and thought that they had to estimate a particular date and time by themselves. I later changed the wording and framed the question in a way that made it clear to users that the answer could be found on the website itself.
Refined task- According to the INST711 class timing and the Standard Final Exam schedule available on Testudo, what would be the final exam date for INST711 for the Spring 2023 semester?

2. How many INST Blended Learning courses are available for the Spring 2023 semester?
● In this task, I had missed to mention whether to check for graduate or undergraduate courses. This made the task cumbersome for participants as they had to go through all the courses available. I later refined the task to specify what exactly to look for.
Refined Task- How many graduate INST Blended Learning courses are available for the Spring 2023 semester?

2.2 Usability Tasks

None of the tasks required users to log in to Testudo using their credentials. In the following task list, the **regular text describes the scenario**, and the **bold text describes the actual task**.

1. You're a graduate student at the University of Maryland's iSchool and you want to explore the courses available for the Spring 2023 semester before registering. **Is there an in-person class scheduled for INST711 for Spring 2023?**

2. Now that you know that INST711 has an in-person class, you want to know where the class will be located on campus. **In which building number will the in-person class of INST711 course take place in the Spring 2023 semester?**

3. After checking the location of the class, you now want to know the final exam schedule for INST711. **Is there a scheduled date and time of the final exam for INST711 for the Spring 2023 semester?**

4. Since there is no final scheduled time for the final exam of INST711, you want to know the tentative exam date. **According to the INST711 class timing and the Standard Final Exam schedule available on Testudo, what would be the final exam date for INST711 for the Spring 2023 semester?**

5. You now want to explore Blended Learning courses that you can register for. **How many graduate INST Blended Learning courses are available for the Spring 2023 semester?**

6. After registering for courses, you want to know by when you can withdraw and change your course registrations. **According to the Academic Deadlines, what is the last date till when you can withdraw/cancel a course with a full 100% refund for the Spring 2023 semester?**

7. You suddenly find out that you unfortunately need to leave graduate school due to personal reasons and want to know the process of withdrawing from all your courses. **What form do you need to complete in order to withdraw from all the courses you have registered for?**

8. Upon withdrawing from graduate school, you want to check the process of ordering an official transcript from the university. **How much does the University of Maryland charge for each official transcript?**

9. After checking the cost, you go through other information about the transcript ordering process. **Can you pick up your transcripts in-person?**

10. You now want to request for an enrollment certification from the university. **As a former student, how many ways are available for you to obtain an enrollment certification?**

2.3 Task List Rationale

Tasks were chosen around 3 main themes- class schedules, exam schedules and transcript ordering process since these are some of the key resources accessed by students at UMD. Apart from these, 1 question about the Withdrawal Form was chosen to understand whether users were aware of this information available on Testudo. Since the participants chosen did not include any former students, 1 question about Enrollment Certification was also chosen in order to understand if users were aware of what resources were available for former UMD students. The tasks were also chosen in a way that made sure users had to visit different webpages within Testudo apart from the homepage to find the required information. This helped in understanding some drawbacks related to the navigation and organization of information on Testudo.
Tasks related to registration and dropping of courses were not included in the task list even though issues related to those were highlighted in the heuristic evaluation. This was done to ensure participants' login information was not revealed and since registration of courses has financial implications.

3. Results

Overall, the usability evaluations took between 16 min and 38 min. (~27 minutes on average)

1. **Task 1** (Is there an in-person class scheduled for INST711 for Spring 2023?)
-   Task 1 took between 22 secs. and 1 min 14 secs. (~48 secs on average)
-   Overall, all participants successfully completed this task relatively easily.
-   P1, P2, P4 and P5 navigated using the main 'Schedule of Classes' button on the homepage and further used the filters section on the page to set semester, level of course and search bar to search 'INST' to get required results.
-   P3 used the search bar in the filters section to search the entire course number 'INST711' and hence finished the task the fastest.
-   P6 took the maximum amount of time to complete this task since they missed the main 'Schedule of Classes' button on the homepage and had to search for it in the '24hrs interactive web services' section.

2. **Task 2** (In which building number will the in-person class of INST711 course take place in the Spring 2023 semester?)
-   Task 2 took between 5 secs. and 8 secs. (~6.5 secs on average)
-   This task took very less time for all users since it was related to Task 1 and information was available on the same page as for Task 1.
-   While all participants attempted the task, 5 of them completed this task successfully.
-   P6 completed the task but gave the incorrect answer. The question was to check the building number which was shown in a tooltip upon hovering on the room number specified in the course description. However, the participant thought that the room number was the building number and provided that as the answer.

3. **Task 3** (Is there a scheduled date and time of the final exam for INST711 for the Spring 2023 semester?)
-   Task 3 took between 22 secs. to 1 min. 20 secs. (~51 secs on average)
-   Only 2 participants P1 & P2 completed this task successfully, while P3, P4, P5 & P6 completed this task but gave the incorrect answer.
-   Overall, all participants except P5 took some time to find the 'Final Exams' tab. All participants first tried to find the information in the INST711 course description or syllabus information and then explored other areas of the webpage.
-   Interestingly, all participants who gave the wrong answer made the same error of not changing the semester in the filters provided at the top of the page. They all checked the exam dates for the Fall 2022 semester instead of Spring 2023 semester.

4. **Task 4** (According to the INST711 class timing and the Standard Final Exam schedule available on Testudo, what would be the final exam date for INST711 for the Spring 2023 semester?)
-   Task 4 took between 20 secs. to 1 min 40 secs. (~ 1 min. on average)
-   Overall, all participants struggled with this task. 3 participants (P1, P3 & P4) successfully completed the task, whereas 3 participants (P2, P5 & P6) completed the task but gave incorrect answers.
-   P3 was the only one who found the Standard Final Exam Schedule easily and fast.
-   P1, P2, P4 & P5 all first checked the Past Schedule link to find information.
-   P1 & P4 found the relevant link and information after some exploring.
-   After checking the Past Schedule' link, P2 then used chrome's 'Find' tool on Testudo's homepage to find the words 'Standard Final Exam' and later used Testudo's search feature which pointed to the relevant page. However, while checking the actual answer which was dependent on the class day & time, the participant gave the wrong answer.
-   After checking the Past Schedule' link, P5 checked the 'Schedule Adjustment Period' link, then he directly used Google search and was led to UMD's main website's Semester Calendar page. He gave the answer based on the information available on this page.
-   P6 did not find the 'Standard Final Exam Schedule' and assumed that the exam day & time would be same as the class day & time and gave that as the answer.

5. **Task 5** (How many graduate INST Blended Learning courses are available for the Spring 2023 semester?)
-   This task took between 24 secs. to 1 min 34 secs. (~59 secs. on average)
-   All participants completed this task, 5 of them completed it successfully and one (P3) gave the incorrect answer.
-   P1 & P4 did not use the Blended Learning filter at first and hence took some time to complete the task.
-   P2 used chrome's 'Find' tool on the Schedule of Classes page to find the Blended learning filter and then found the relevant courses.
-   P3 found the Blended learning filter quickly, however he did not select the graduate filter and hence gave the incorrect answer.
-   P5 and P6 did not know what Blended Learning courses are and hence took the maximum amount of time to complete the task.
-   P5 first used Google search which led him to UMD's main website. He later navigated to the Core Courses section on Testudo's Schedule of Classes page. Finally, he found the Blended Learning filter on the All Courses page using chrome's Find tool.

- P6 tried to find the information on Testudo's homepage. She later navigated to the Core Courses section on the Schedule of Classes page, explored for a while there and eventually found the Blended Learning filter on the All Courses page using chrome's Find tool.

6. **Task 6** (According to the Academic Deadlines, what is the last date till when you can withdraw/cancel a course with a full 100% refund for the Spring 2023 semester?
- Task 6 took between 22 secs. to 1 min 43 secs. (~62.5 secs. on average)
- Overall, all participants completed the task successfully.
- All participants except P1 & P3 found the Academic Deadlines quickly and easily on the Testudo homepage and could complete the task relatively faster.
- P2 & P5 used chrome's Find tool on testudo's homepage and hence found the Academic Deadlines link very fast.
- P1 & P3 spent some time searching for the link on the Schedule of Classes page before navigating back to the homepage and hence took the maximum amount of time to complete the task. Both participants were annoyed that there was no way to go to the Testudo homepage from the Schedule of Classes page, apart from switching tabs.

7. **Task 7** (What form do you need to complete in order to withdraw from all the courses you have registered for?)
- Task 7 took between 20 secs. to 9 min. 34 secs. (~5 mins. on average)
- Overall, almost all participants struggled with this task.
- P1, P4 & P6 completed the task successfully, P2 completed the task but gave the incorrect answer, and P3 & P5 attempted but did not complete the task.
- P1, P2, P3, P4 and P5 all checked the Schedule Adjustment Period first.
- P1, P2 & P4 correctly used the top bar to navigate to Current Students > Petitions & Forms. From there, P1 & P4 found the correct link – 'Withdrawal – Graduate Students' and found the correct form. P2 clicked on the 'Cancel Registration' link and found the incorrect form as the answer.
- P3 & P5 spent considerable amount of time looking through various links. P5 used Google search and was led to UMD's Graduate School website. Eventually, both the participants did not complete the task.
- P6 took the maximum amount of time to complete the task. After searching for a while on the Testudo homepage and clicking various different links, she clicked on a link that led to the external UMD Grad school website. She checked more links on this website and used the search feature here before being led to the main UMD website. She finally found the correct form on this main website.

8. **Task 8** (How much does the University of Maryland charge for each official transcript?

– Task 8 took between 6 secs. to 1 min. 52 secs. (~59 secs. on average)
– All participants completed this task successfully and relatively easily.
– P2 used chrome's Find tool on Testudo's homepage and found the 'Transcript Ordering' link which led to the correct webpage that provided the answer.
– P1, P3 & P6 found the 'Transcript Ordering' link on Testudo's homepage relatively easily however, spent a lot of time reading the text on the transcript page. All 3 users first skimmed through the text and then had to read again to find the required information.
– P4 used the top bar to navigate to Current Students > Online Transactions > Transcript ordering. She was able to find the required information quickly on the transcript page.
– P5 directly used Google search and hence was able to complete the task fastest, in 6 secs.

9. **Task 9** (Can you pick up your transcripts in-person?)
–   Task 9 took between 8 secs. to 50 secs. (~29 secs. on average)
–   All participants completed this task successfully and relatively easily.
–   This task took less time for almost all users since it was related to the previous task and information was available on the same page as for Task 8.
–   P1, P3, P4 & P6 checked all the different sections on the Transcript Ordering page before finding the required information in the FAQs section.
–   P2 directly clicked on the FAQs section and hence found the answer the fastest. Upon asking why she did not check the other sections, the user mentioned that none of the section titles seemed relevant to the task and hence the only option she thought would provide the relevant information was the FAQs section.
–   P5 took the maximum amount of time to complete the task since he clicked on multiple links available on the Transcripts page hoping to find the relevant answer, before finally finding the information in the FAQs section.

10. **Task 10** (As a former student, how many ways are available for you to obtain an enrollment certification?)
–   Task 10 took between 21 secs. to 5 min. 50 secs. (~3 mins. on average)
–   Except P3, all participants successfully completed the task.
–   P1 & P2 first clicked on the 'Enrollment Certification Request & Status' link on the homepage which was meant for current students and hence led to the login page. Both users then found the 'Former Student Access' link on the left navigation on the homepage and from there they successfully found the correct link that led to the relevant information.
–   P3 also first clicked on the 'Enrollment Certification Request & Status' link on the homepage which was meant for current students and hence led to the login page. After that, he kept searching for a relevant link on the homepage and eventually gave up and did not complete the task.

- P4 was the only participant who consistently used the top navigation bar. Even for this task, she navigated to Former Students > Petitions & Forms > Enrollment Verification Request to find the correct information.
- P5 again directly used Google search to find the correct page with the required information and was hence able to complete the task the fastest, in 21 secs.
- P6 started on the Transcripts page and kept searching there. Interestingly, she missed the top navigation bar with the Former Students menu. She then struggled to find information on Testudo's homepage, where she clicked on a bunch of links that led her to the external UMD Grad school website. Here, she used the search feature to finally find the required information.

Table 2: Task Time (mins.)

PID OR Pseudonym	Task 1	Task 2	Task 3	Task 4	Task 5	Task 6	Task 7	Task 8	Task 9	Task 10
P1	00:57	00:08	01:10	01:15	01:07	01:24	03:45	01:10	00:15	01:28
P2	00:41	00:05	00:58	01:40	00:24	00:25	03:04	00:38	00:08	01:35
P3	00:22	00:05	00:32	01:37	00:40	01:43	02:04	01:23	00:15	01:30
P4	00:58	00:08	00:40	01:30	00:54	00:22	00:52	00:50	00:25	00:51
P5	00:27	00:08	00:22	00:50	01:29	00:52	00:20	00:06	00:50	00:21
P6	01:14	00:08	01:00	00:20	01:34	00:22	09:34	01:52	00:42	05:50

Table3: Task Performance

PID OR Pseudonym	Task 1	Task 2	Task 3	Task 4	Task 5	Task 6	Task 7	Task 8	Task 9	Task 10
P1	1	1	1	1	1	1	1	1	1	1
P2	1	1	1	4	1	1	4	1	1	1
P3	1	1	4	1	4	1	2	1	1	2
P4	1	1	4	1	1	1	1	1	1	1
P5	1	1	4	4	1	1	2	1	1	1

P6	1	4	4	4	1	1	1	1	1	1

1 =Successfully Completed Task; 2 = Attempted, but did not Complete Task; 3 = Did not Attempt Task;
*4= Attempted, but gave the incorrect answer*

4. Discussion

4.1 Problems

1.   Search feature of Testudo is not clearly visible

Through the usability testing, I noticed that most participants struggled to find the required information since there were way too many links on a single webpage and they had to read through all of them. As a solution some users used Chrome's 'Find' tool, while some directly used Google to search for the required information. None of the users noticed that Testudo website itself had a search feature that could be leveraged to make the information finding process faster and easier.

The search feature on Testudo is located at the top right corner of the webpage. It is represented only using an icon and not with an entire search bar. This is probably one reason why users do not notice this feature. The feature is also integrated with the main UMD website's header bar and not within Testudo's header. This could be another reason why users overlook this feature since it does not look like it is a part of Testudo.

Search feature expands to show full search bar only after clicking on the search icon
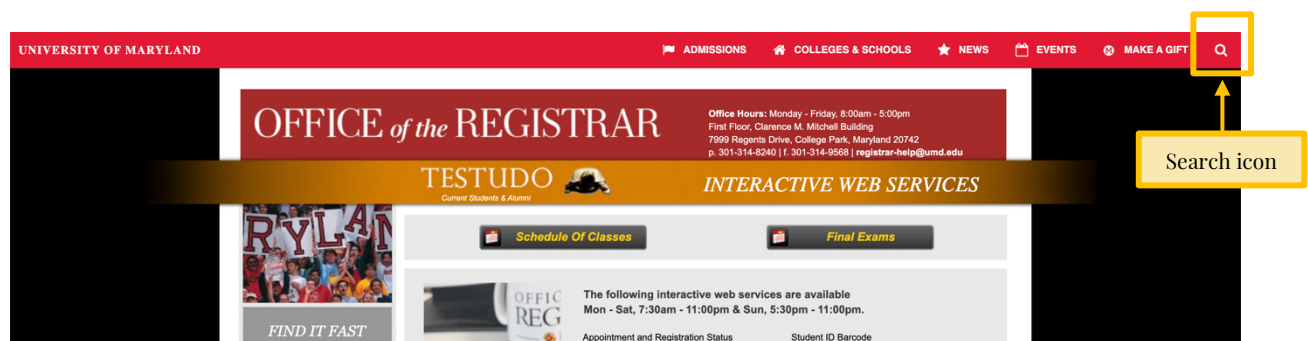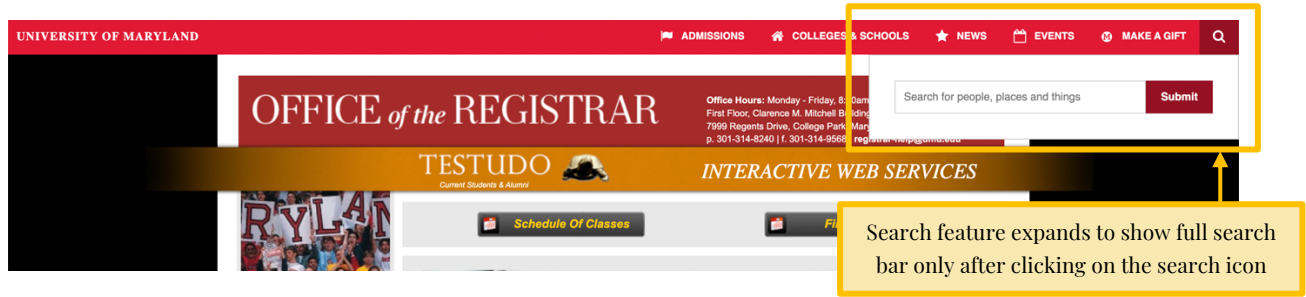
2. Too many links bunched together with no proper classification or segregation of information

For some tasks in the usability testing, I noticed that participants struggled to find the required information since there were too many links on a single webpage without any relevant classification and hence, they had to read through all the links carefully which was very time-consuming.

The Testudo homepage has 3 categories 'Find it Fast' with 12 links, 'Services available between a certain time period' with 9 links and 'Services available 24/7' with 10 links. Here, the problem is that this categorization is not related to the type of content under it and hence, the section titles are not useful for users. And since each of these categories have around 10 or more links each, users have to go through a lot of text in order to find what they are looking for.
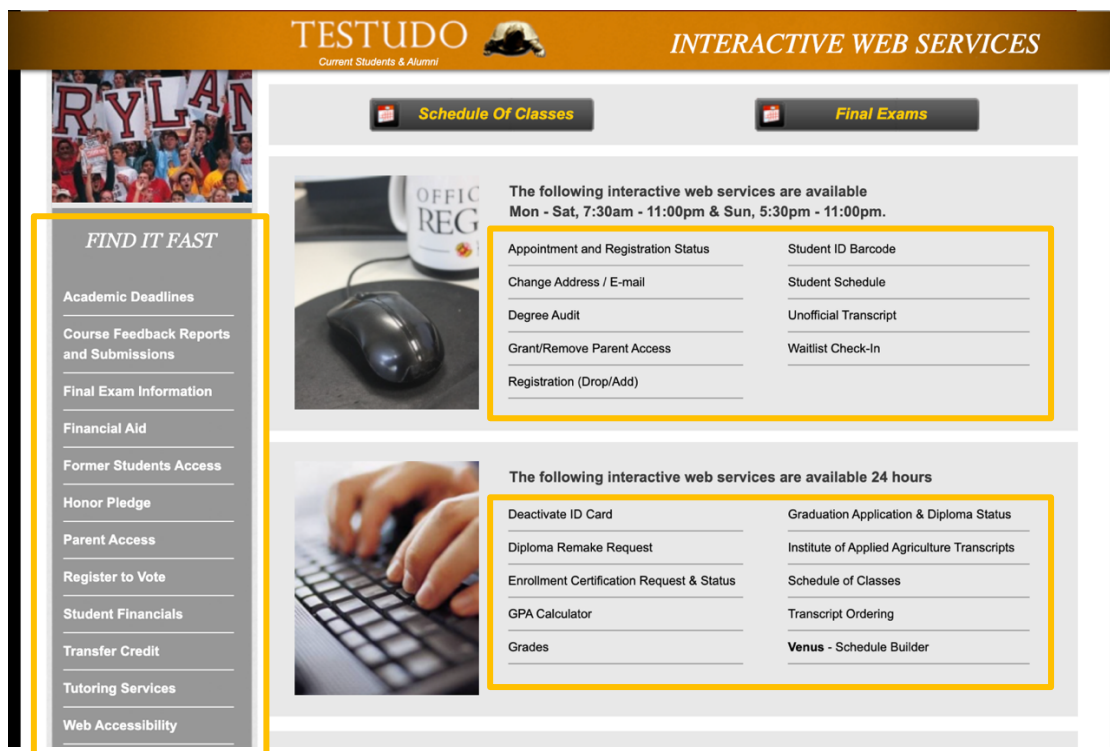
3. Inconsistent information architecture and navigation

Through the usability testing, I noticed that only 2 participants used the top navigation bar available on some pages within the Testudo website. This navigation bar is a quick way to find all required information according to user type and is further categorized in an easy-to-understand way. Other participants either did not find this navigation bar since they searched for maximum information on the homepage, or they did not realize that they could access information through these links.

Some webpages on Testudo have a navigation bar that segregates information based on user types- current students, former students, faculty & staff, and parents. However, the Testudo homepage just has a header bar and does not have the top navigation bar for users to navigate easily from the homepage. Further, when users are on any other webpage to check schedule of classes or perform actions such as registration, drop/add courses, the navigation bar disappears again. Because this navigation bar is not available on the main homepage, many users are not aware of this way to navigate through the website.

Different header on different webpage within Testudo
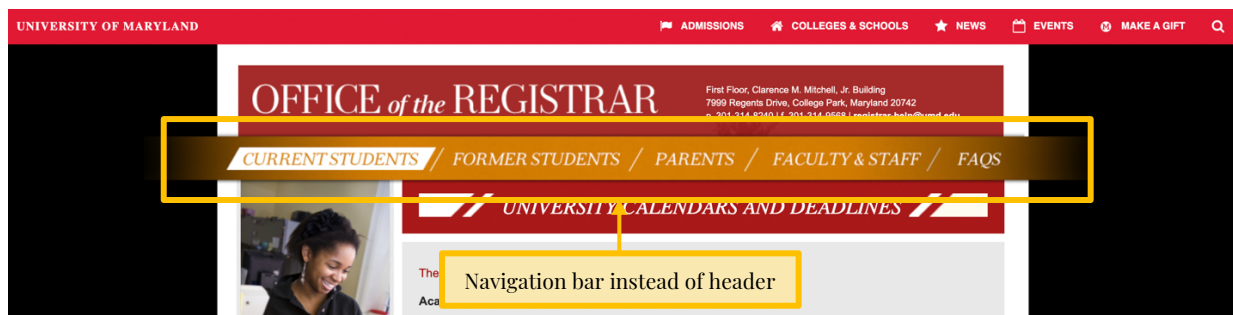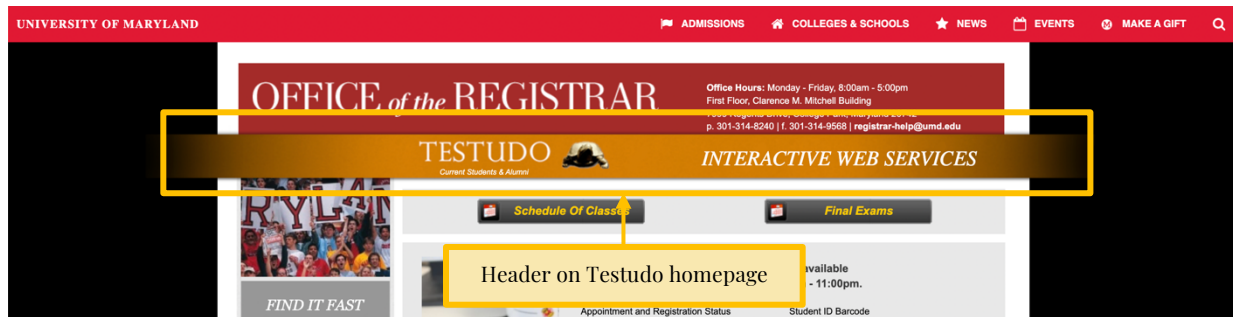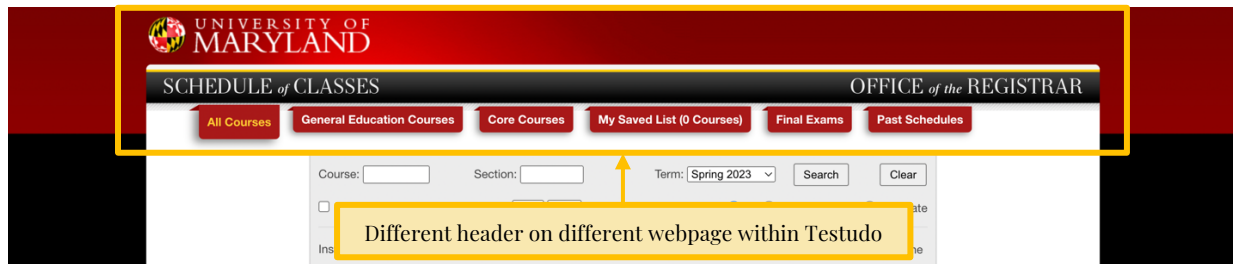
Another navigation problem on Testudo is that there is no way to go back to the homepage from other pages except by changing tabs in the browser or using the 'Back' feature on the browser. One participant (P3) specifically mentioned that this was extremely frustrating.

Usually, the logo or name on the top left of the page leads to the website's homepage or there is another way that leads to the homepage. However, here some pages have the Office of the Registrar logo while some pages have the UMD logo and both of these lead to their own external websites. This could be very confusing for users.

Leads to the Office of the Registrar's external website

Leads to the University of Maryland's external website

4. **Search button on Schedule of Classes page not located properly**

The Schedule of Classes page has a search and filter section at the top pf the page that helps users to look for specific courses. For tasks 1, 2 & 5 I noticed that participants were forgetting to click on the search button after setting filters for the type of course they were looking for. This was because the Search button was located in the topmost row of the section and there were more filter options below it. Since it was located around other options, users easily missed it.

5. Standard Final Exam Schedule button on Final Exams page is too small to notice

For task 3 & 4, users had to navigate to the Final Exams tab and search for the Spring 2023 exam schedule. Since the Spring 2023 schedule is not available until mid-semester, Testudo provides a link to the Standard Final Exam Schedule. However, the text is written in a very small font and the link is also in the same font size. Due to this, all participants missed it and instead navigated to the Past Schedules tab. They further navigated to the homepage and had to find the required information through other pages when they could've saved a lot of time by accessing the link from the same page itself.

4.2 Improvements

1. Search feature

In order to make sure that the search feature is clearly visible to users and to make the information finding process easier, the search bar needs to be placed in a better location. Hence, in this suggested improvement, I have moved the search feature from the top right corner of the page to the top central portion of the page just below the header. This area of the page was

underutilized since there was a lot of empty space around the two main buttons of 'Schedule of Classes' & 'Final Exams'. I have also kept the entire search bar visible unlike the way it is right now with just the search icon visible at first.
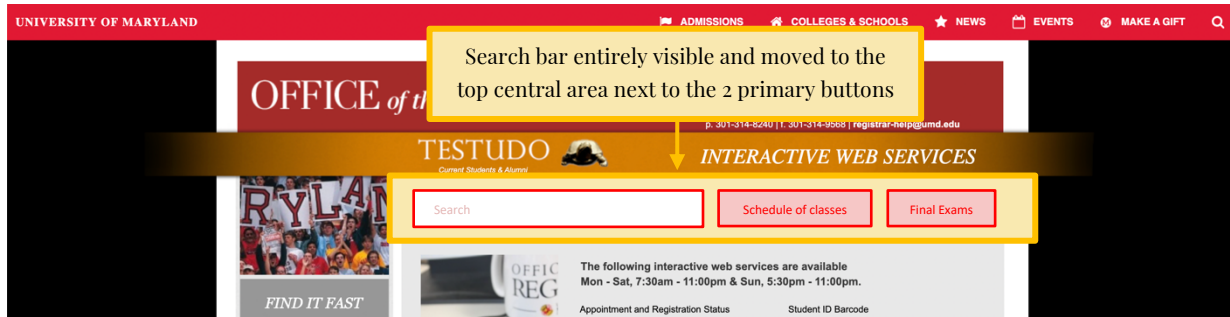
2. Inconsistent information architecture and navigation

To help users navigate the website better, here I have suggested introducing the top navigation bar on Testudo's homepage. This navigation bar already exists on other pages of the website, hence, adding it to the homepage will also aid in maintaining consistency. The content on the homepage can then be designed and structured according to which tab the user is currently on. This will ensure that the information architecture is also understandable to all users.

3. Too many links bunched together with no segregation

In order to reduce cognitive load in users, in this suggestion for Testudo's homepage, I have incorporated the top navigation bar mentioned in the suggestion above. Further the content below is segregated based on categories that are easily understandable and are consistent with other pages within the website. For the left navigation panel of 'Find it Fast' links, the links have been segregated in an accordion style. This allows users to open only specific sections they want to check and hence save time in finding required information.

4. Search button on Schedule of Classes page

In this suggested improvement, I have moved the location and changed the style of the Search button in the filters section of the Schedule of Classes page. The button now has the primary action color and is moved at the bottom of the filters section, where there is enough empty space around it, so it stands out properly and users don't miss it. The button to clear selections has also been moved at the bottom of the filters section and has been given the secondary button style. The "hide advanced options" link is moved above the main search button.

5. Standard Final Exam Schedule Button

In this suggested improvement, I have added a button for the Standard Final Exam Schedule link. The button is styled in the primary action color to ensure that users don't miss important links.

Of the various potential improvements that were discovered through the user-based testing and the heuristic evaluation, I would list the following 3 improvements as top 3 priorities:

1. Improving the information architecture and navigation
Reason- Consistency is one of the most important design principles that helps in making a website usable. On Testudo, the header and navigation not being consistent creates a lot of confusion and frustration in users which can be avoided if it is fixed. By providing a consistent navigation bar with clearly defined menu options and categories, users can find information easily and without spending a lot of time.

2. Search feature
Reason- Since Testudo provides information on a large variety of topics and caters to various different users - current students, former students, faculty & staff, and parents, it is important to

design a search feature that is easily accessible. By improving the search feature's location and style as shown in the suggestions above, users' information finding process can become very efficient and quick.

3. Classification of information on homepage

Reason– The Testudo homepage is the most visited page by all its users and hence it should be the topmost priority to design it in a way that is easy to use. Clearly categorizing all the different information available on the page will help in reducing cognitive overload and aid users in finding required information in an easy and fast way.

Part 3: Methodological Reflection

1. Comparison: Expert Review & Usability Testing **Similarities**

Two main similarities that I found in the user-based testing and the heuristic review are–
- Inconsistent information architecture and navigation &
- Too many links bunched together without any categorization

In the expert evaluation, I observed these issues under the 'consistency & standards' and the 'aesthetic & minimal design' heuristics respectively. During the usability testing, I noticed users getting frustrated or taking a lot of time to find certain information due to these issues.

2. Contrast: Expert Review vs. Usability Testing **Differences**

None of my findings of the heuristic evaluation and usability testing conflicted with one another. This was primarily because most of my heuristic evaluation focused on registration and dropping of courses, updating personal information and such tasks that require users to log in to Testudo. Since I could not include such tasks in my usability evaluation, most of the tasks were different and revolved about information finding.

However, there were a few issues that I had missed out on while conducting the heuristic evaluation, but which came to light during the usability testing. Few examples of such issues are-
- Search button in the filters section of the Schedule of Classes page
- Main search feature of Testudo which is not clearly visible and accessible
- No way to return to homepage through other pages within testudo

3. Lessons Learned: Expert Review vs. Usability Testing

Few of the things I learnt through this heuristic evaluation and usability testing are–
- Only one method of evaluation cannot help in understanding all the potential issues that exist in a website. It is important to conduct different types of evaluations to uncover and fix all the usability issues.
- It is important to conduct user testing in order to understand how users think and what they expect in a particular situation.
- Moderated testing also gives the chance to ask users follow-up questions which further helps in understanding why users perform certain actions.