Blackboard Website

HCC-729

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Introduction and Motivation

In this project we worked on the Blackboard website for the University of Maryland Baltimore County (UMBC). The Blackboard is a web-based online learning platform and learning management system [3]. This platform allows users to take or host online courses. Students and teachers can connect each other through assignments, video conferencing, discussion groups, exams, etc. using the Blackboard. Students, professors, teaching assistants, and graders, IT support team, accessibility support team, and school organization are the main user of the website. This website is the most important tool for UMBC's instructors to make course resources available to students, as well as for students to access class updates and materials, as well as to submit assignments and deliverables. The Blackboard allows users to conduct all aspects of an online course while also providing numerous valuable features to aid offline courses too.

Since the start of global pandemic, Blackboard provides more effective services which are important for both virtual and offline classes. For example, it offers various main functionality such as; managing student attendance for online courses, conducting online exams, uploading assignments, recording and saving courses, checking course progression, making announcements and office hours, grading assignments, etc. In addition, Instructors can create discussion threads, groups, and questions for students to stimulate conversation, inquiries, and group work.

Even though the website covers mostly all of the E-learning options and users' needs, this website still has some visibility and functionality problems. Most of the new students are not able to navigate the website clearly and find materials. Some significant data is not visible and students need to search different pages to find them.

Based on our research we find some main problems. First, the website's home page contains general information about accessibility, help, FAQ, etc. However, important information about courses such as deadlines, course's date and location should be provided on the main page. Second, users need to read a lot of instructions to do functions such as submitting assignments, creating an assignment for students, creating groups for students, and etc. Sometimes, it could get confusing for users when they are unaware of some buttons functionality. This website should provide better user flow for students and instructors. Moreover, this website does not have search capability which could create a huge problem for new students who may not be familiar with all the pages and their functionalities. Having a search feature could help them to find materials faster and easier.

In this project we tried to re-designed the Blackboard website and create more user-friendly platform. Our purpose was to achieve a better balance between instructors, students, and the university needs. To make the website less overwhelming and more user friendly, we added more features to the website option to advance the functionality of it. We conducted user experience research, interview, competitive audit, user flow map, heuristic evaluation, etc. Moreover, We created two fictional personas and visualized them as a real person. We inspired these two characters from the semi structured interviews and from the Blackboard real users. This method helps us to better understand users and their needs, paint point and their purpose of using the website. The main purpose was to investigate users' need, usability of the website, and collect all related data to redesign the website.

Known problems

As part of the interview process and heuristic evaluation, various issues were identified. Each of these methods showed similar findings that were mostly related to visibility, consistency, feedback, error-prevention and learnability. By conducting heuristic evaluation, we realized that blackboard is functional in the sense that it provides almost all the features needed but they are not easily learnable and discoverable. Blackboard shows issues with the implementation of some very basic usability principles as well as it has many minor problems which make the user experience not intuitive and very challenging.

Another major issue was missing a search box for the entire website. This perhaps could create challenges with the new users. Also, the Blackboard does not have notifications features and alerts which might be helpful for the students who need to meet deadlines, course progression or wants to know feedback from the instructors. It might not be convenient for the students to check information at the blackboard every day. The position of the 'cross' button and lack of a back button at the blackboard website creates several issues. It makes the use of different pages inefficient, impacts the navigation experience and also causes the users to make mistakes. The 'cross' button is placed in a position where it can be clicked by mistake very easily which brings the users to all courses pages. The user then needs to navigate all the way to his/her intended page for that mistake. Well-designed and separated back button and cross or bring to all pages buttons may be needed which we found in our exploration.

Another problem with the blackboard website is consistency issues in different pages. Different parts of the website may show different menus and layouts which will be very confusing. In most cases it depends on how the course instructor sets his/her course page, but a basic outline can be implemented in the design of it. Blackboard has a

discussion board feature for every course. For some courses discussion might be an integral part of the learning process. The discussion board of the blackboard website is not interactive at all. It doesn't look dynamic as it should be to encourage meaningful discussion or interaction. Users can reply to each other, but the experience is not great. As the users are likely to be exposed to different platforms for discussion nowadays, blackboard's discussion board experience must be improved. Another major finding during the heuristic evaluation was the fact that Blackboard made it difficult to access the previously recorded videos.

Valuable insights regarding user experience challenges were recorded during the interview process with participants. Both of our participants highlighted their challenges with blackboard during first time usages. They found it difficult to navigate and unintuitive. Many of their raised issues overlap with our heuristic evaluation too like the position of the cross button, non-interactive discussion board, inconsistencies, etc. They mentioned making mistakes like joining a different room for an online class, not finding previous recordings, and clicking the cross button by mistake. These instances reinforce our assumption that the blackboard website is functional but not all of their features are easily discoverable and learnable. Our participants also appreciated some good features like 'activity stream' which helps them to keep track of their progression and deliverables. The interviewees provided some suggestions such as having large clear boxes for the important functionalities at the course home page and integrating other UMBC sites like the career center with the profile page at blackboard.

Design & prototyping activities

First we created an information architecture to process a path taken by a prototypical user on a website to complete a task. This map takes a user from an entry point through a set of steps towards a successful outcome and final action, such as submitting assignments. The website map helped us to organize and clarify the content that needed to be on the site to be used in planning (Figure 1).

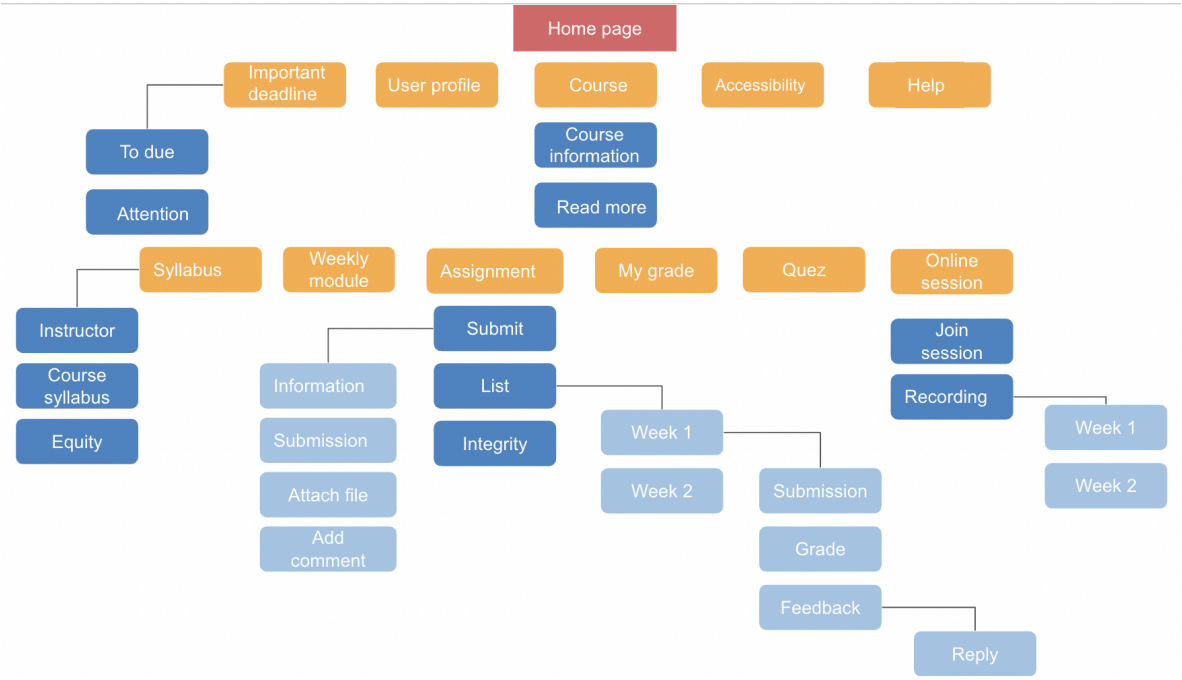


Figure 1: Information Architecture

We also created user flows that helped us to visualize the steps user takes to complete tasks and achieve a goal on our product. It also helped to strategically capture and communicate the user interactions that they experience in a larger context(Figure 2).

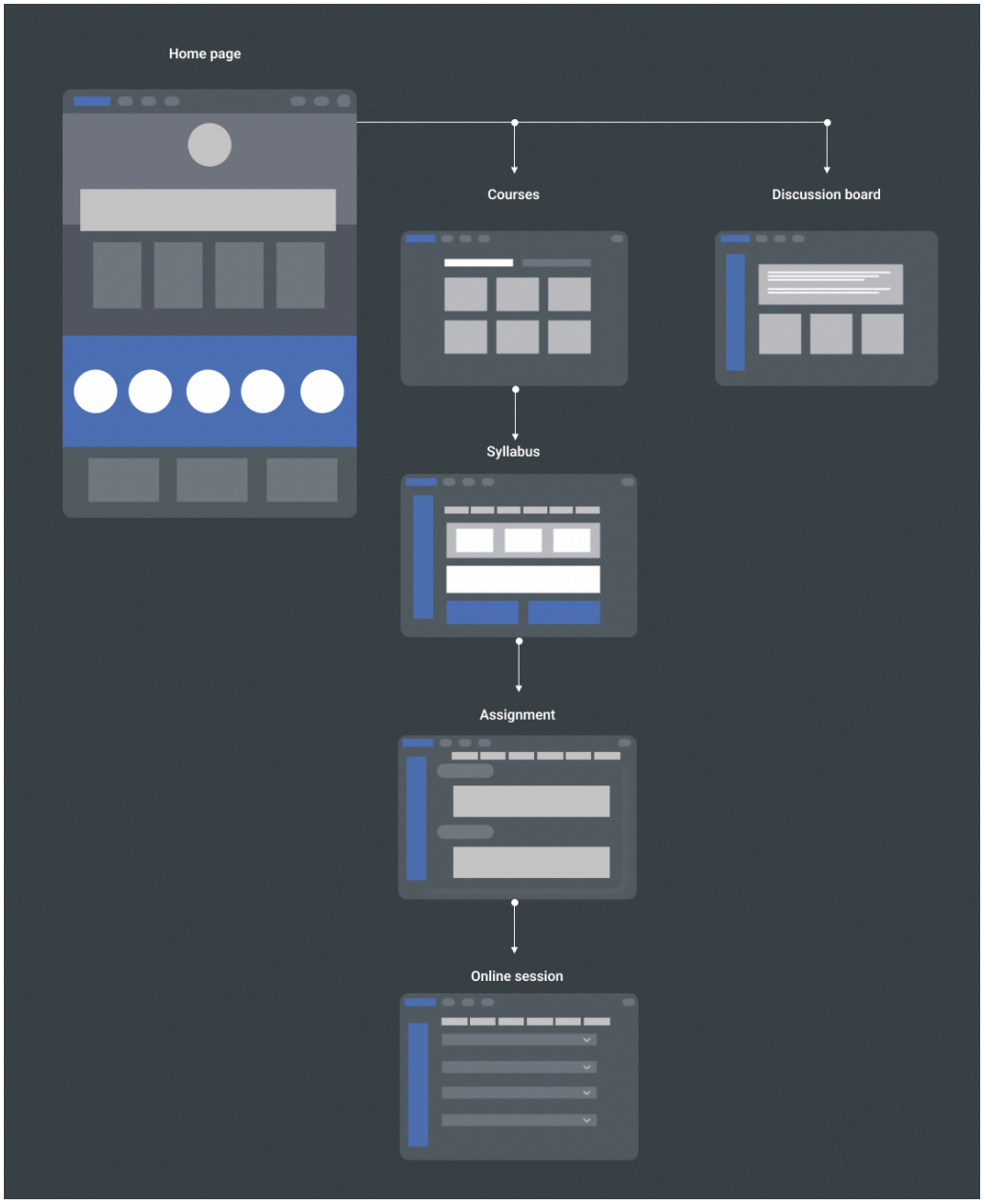


Figure 2: User flows map

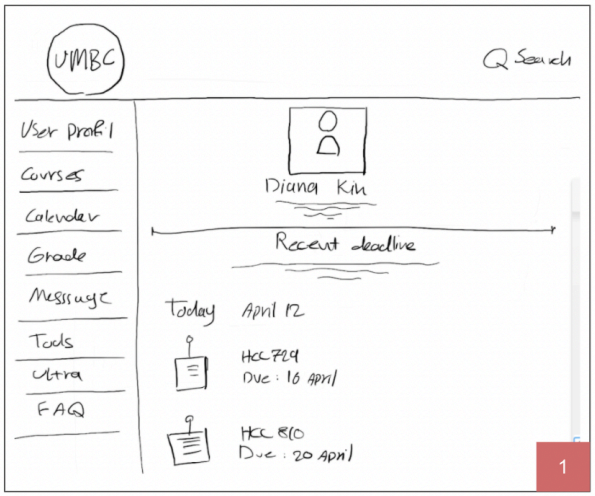
1. **Low- fidelity prototypes**

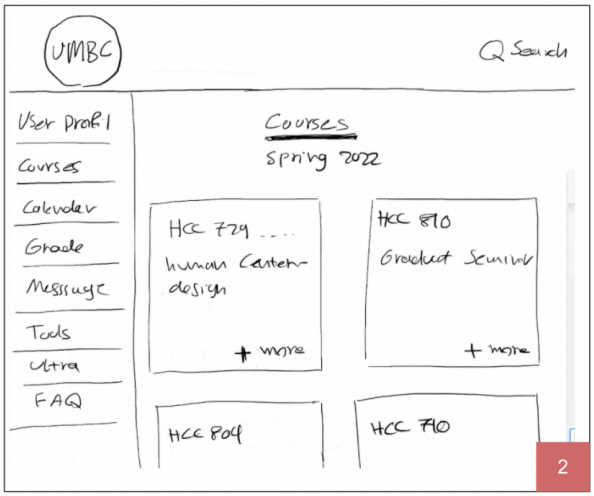
We created three low-fidelity prototypes for home page, course page, and discussion page.

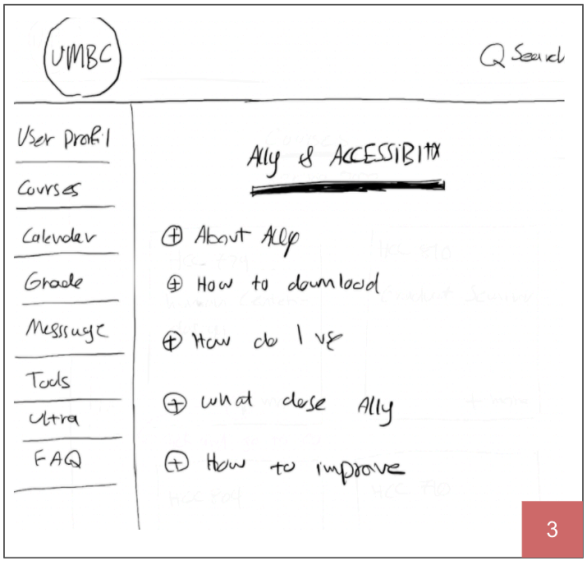
Home page. One of the most important problems mentioned by participants is about the home page(Figure 3). Based on the interview and heuristic evaluation result we observed that there is much irrelevant information on the home page. The current home page of the website mostly focuses on FAQ, help, etc. However, based on our

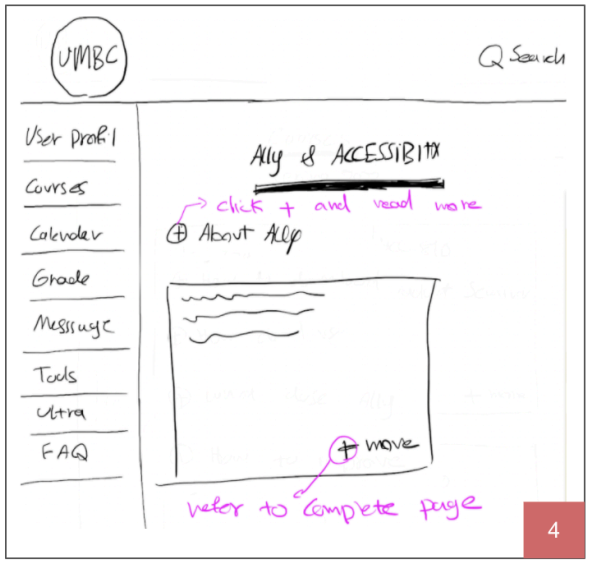
interviews, we realized that users prefer to see more important information on the home page. Based on our redesign, there are five main sections for the first page: 1) user profile, 2) important deadline, 3) Courses, 4) Accessibility, 5) Help, 6) Search box

We added more significant and related information such as mit-term, final term, comprehensive quiz, and weekly assignment deadlines. This information is presented at the first section of the home page by clicking on each section where more information can be obtained.









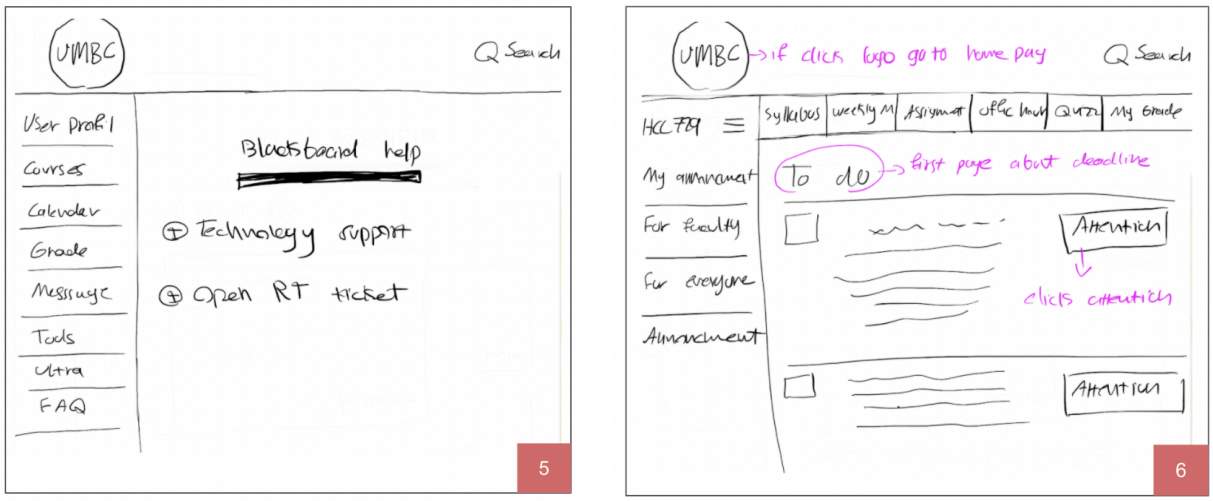


Figure 3: Home page

Course page. We observed that there is no consistency design for different courses. Currently each course offers a different way of design. We tried to create a more comprehensive interface for all courses which can improve user navigation and flow of the website. Students can access courses quickly through the first page. Each course includes:1) syllabus, 2) assignment, 3) weekly module, 4) quizzes, 5) my grade, 6) online session.

We added more content for syllabus, assignment, and online session pages.For instance “Syllabus” contains information about the instructor such as office hours, email address, room address, etc. (Figure 4). “ Online class” we have more minimal interface, direct language, and clean navigation (Figure 4), and we added three sections for “Assignment” (Figure 4) page. These sections are:

1) Submit: Students can submit assignments, add comments, and read general information and requirements for homework.

2) List of assignments: According to heuristic evaluation, we realized that there is no specific section for collecting previous assignments. We wanted to design a page that contains information about all assignments of each semester such as grading and feedback (Figure 5).

3) Integrity: Academic integrity describes the ethical commitment of the UMBC community.

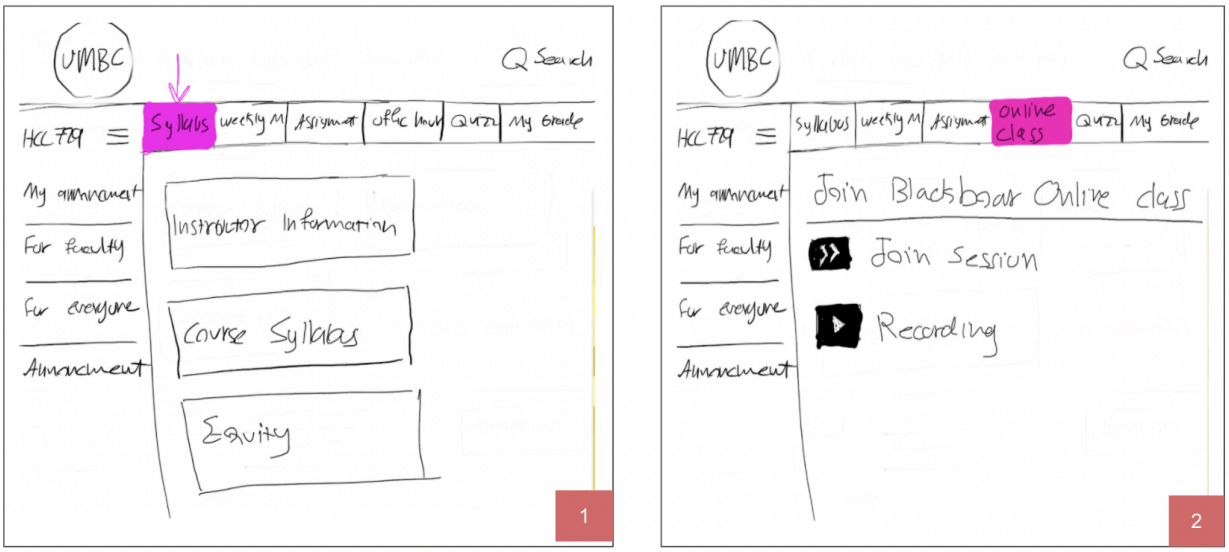
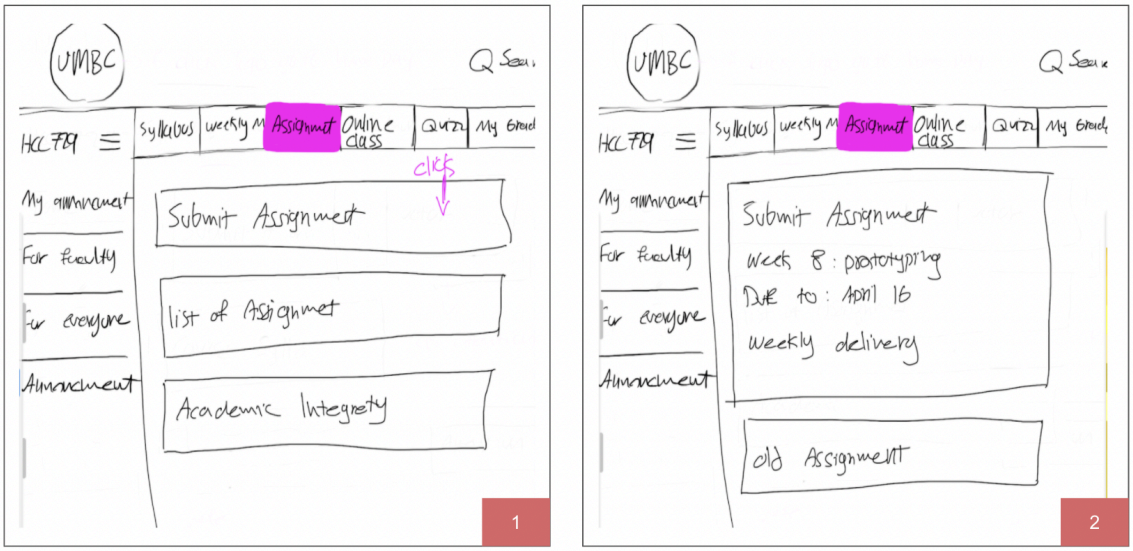


Figure 4: Syllabus and Online session



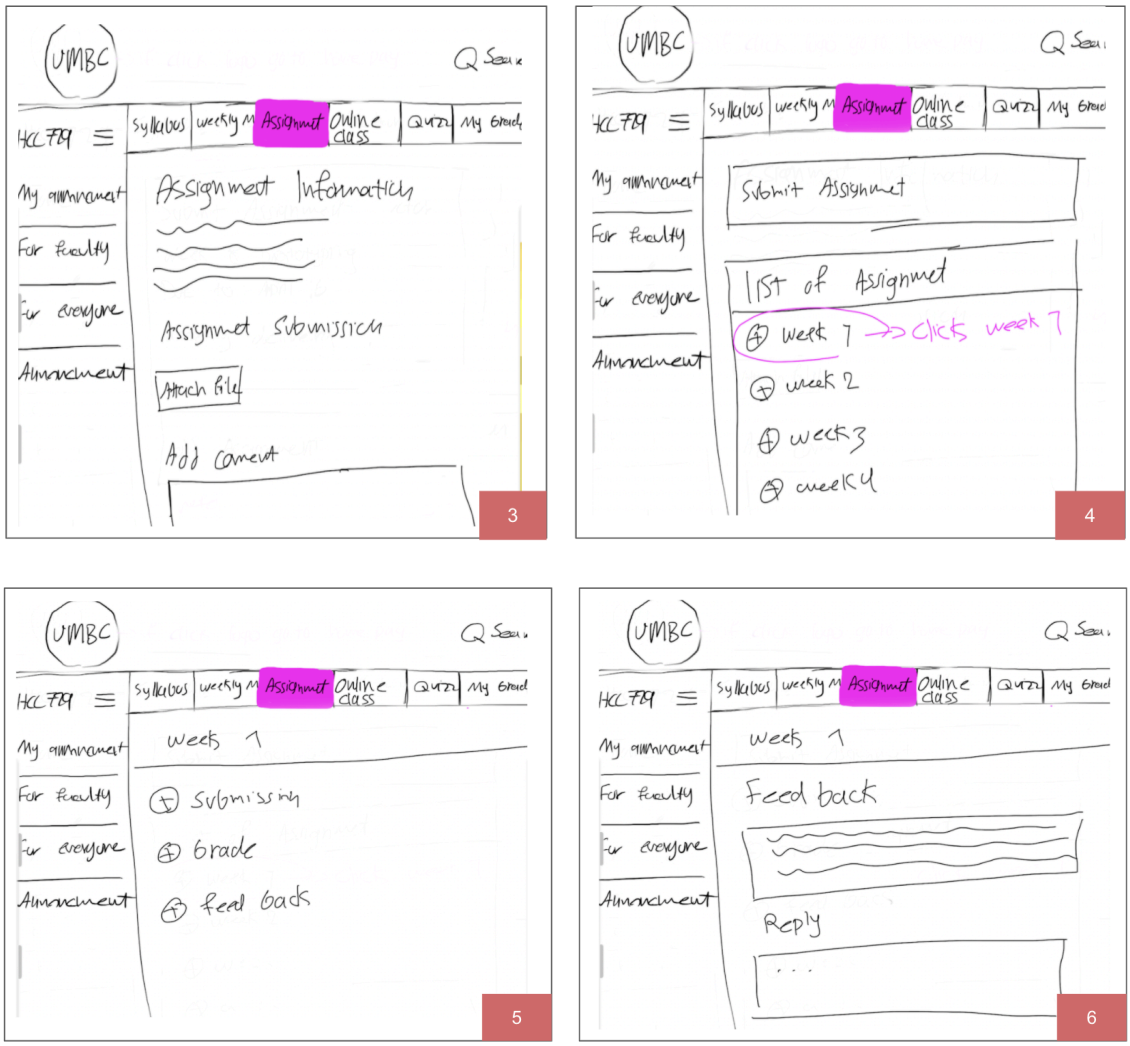


Figure 5: Assignment page

The discussion board page. Discussion board page is the last Lo-fi prototype. In our analysis, we found that for some courses, it is important to support interactive discussion and exchange of thoughts between students and instructors. Based on the interviews and heuristic evaluation, we found that the discussion board of blackboard is very static by design, it doesn't feel interactive and formatting texts in the thread sometimes becomes a bit challenging for both students and instructors. One of the interview participants also mentioned his experience of interacting in various social media platforms nowadays which feels so smooth. In designing our prototype we particularly took inspiration from popular social media sites like Facebook, Twitter and Reddit. We also looked into 'Discord' as this platform focuses on discussion particularly. In the prototype we imagine the discussion board as a feed of different threads created

by students and instructors of the course. The user can create a new thread by clicking on a button at the top or participate in any existing thread by commenting and replying to the comments. Users can also search by keywords to find previous threads on any particular topic. The threads would work as posts where others can comment, mention others, reply and attach photos or files. The comment and replies would be displayed in a nested comments style which would enable the users to follow the flow of the discussion. The familiar newsfeed style layout would feel much more comfortable and interactive as users in many cases are familiar with the social networking platforms.

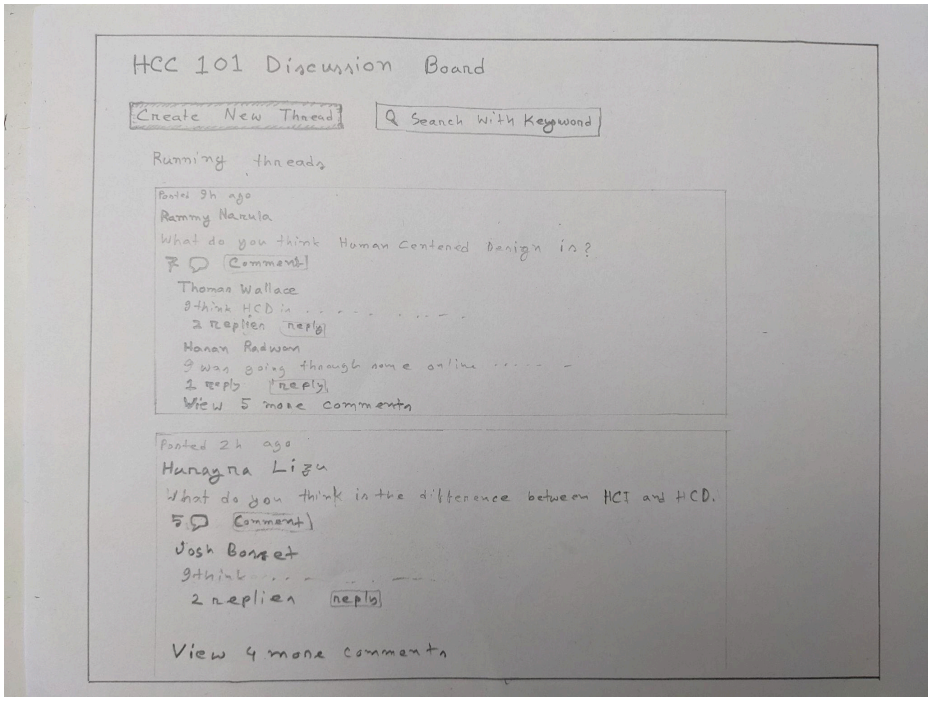


Figure 6: Discussion board home page

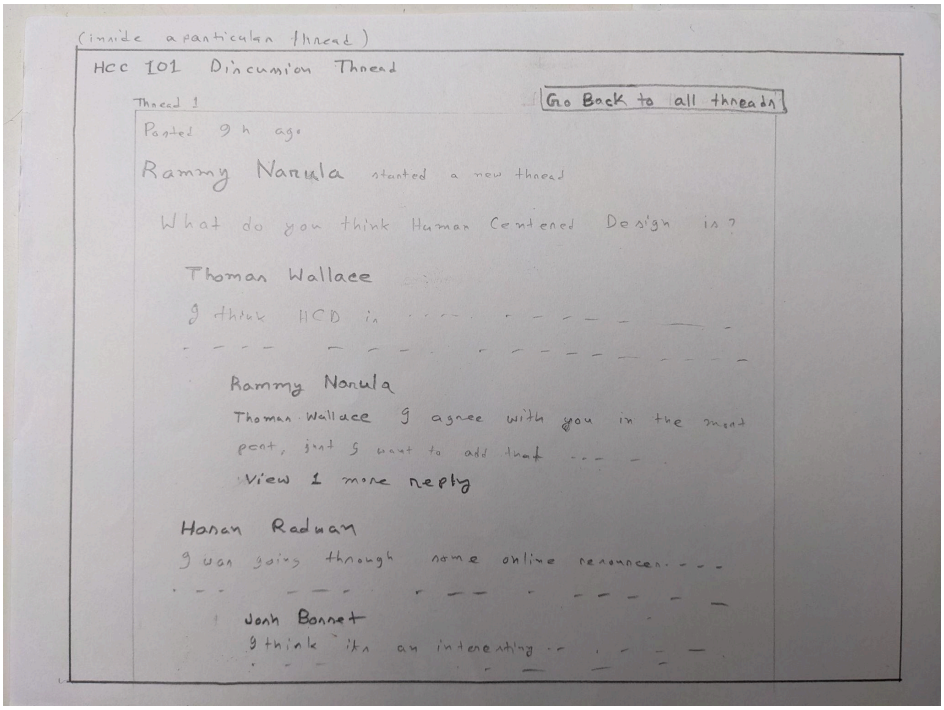


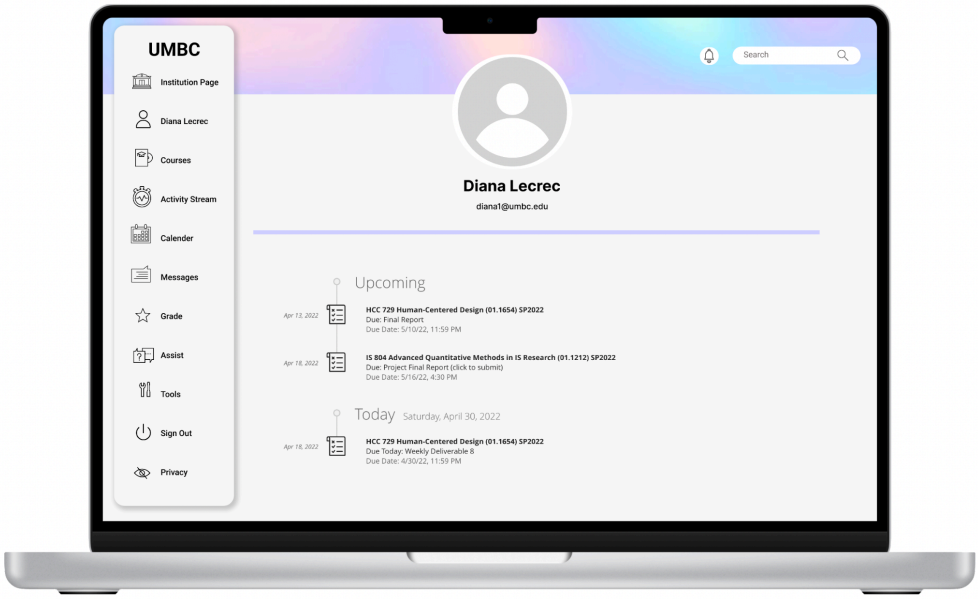
Figure 7: Inside a particular thread

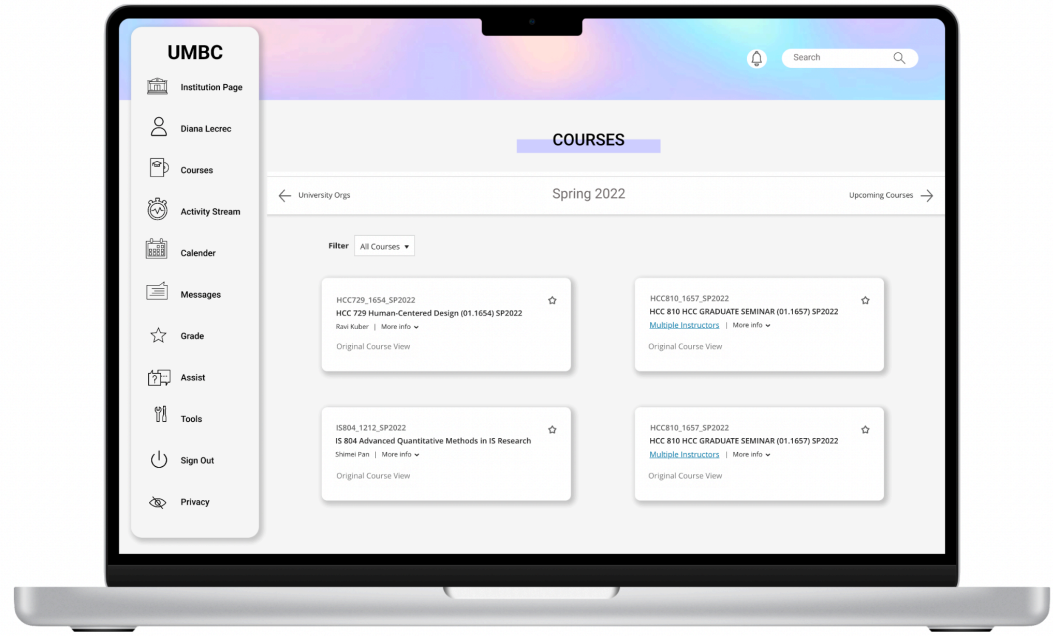
We evaluated our low-fidelity prototypes with two Blackboard website's users. The first user was a 29 years old PhD student in Information Systems at UMBC. She usually spends 1 hours every day on the website and her usage hour can be different day to day. She uses this website for attending virtual courses and exams, accessing course materials and submitting assignments. The 2nd participant was a Engineering Management Masters student (25, Male) from UMBC, who is going to graduate this semester. He has been using Blackboard for more than one and a half years and spends approximately one hour everyday on the website. We tested low-fidelity prototypes in person at UMBC library. First we sketched our concepts on tablet and paper and asked users to interact with them. We conducted a usability test to be able to discover problems and identify points where users struggle. Then we asked them to write her feedback while testing our prototype. These are some important feedback we received from participants:

- Home page should include technical support information.
- Home page should include messages notification
- Assignment page should demonstrate more detailed information about the assignment on the first page.
- Discussion page should have access to old comments
- Discussion page should have keywords search capability to improve the searching process.

2. Medium-fidelity prototypes

Home page medium fidelity. The first mid-fid prototype was the home page of Black board. We aimed to help users to access important information on the Home Page of Blackboard such as quick access to important deadlines, courses, and accessibility support via Homepage. These items should be visible and have a navigable manner for users. Based on low-fidelity testing we added Technical support and help sections on the first page. Also, we added search box features on the home page. This feature helps users to write a keyword and find specific topics more conveniently. Having a search box is one of the important elements for websites, especially if users are not familiar with the structure of the page. This feature could be very helpful in terms of navigation. Finally, we added a notification ring on top of the website based on our low fidelity test. Currently the website does not contain any notification alarm.Sometimes students can miss important messages or feedback from instructors. We added ring vector as a symbol of alarm to notify users.





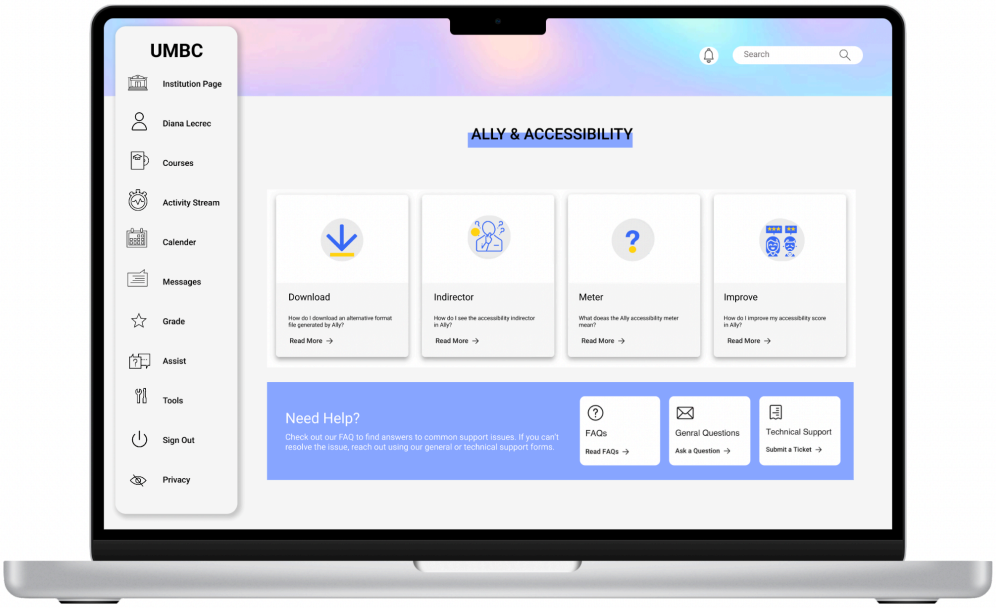
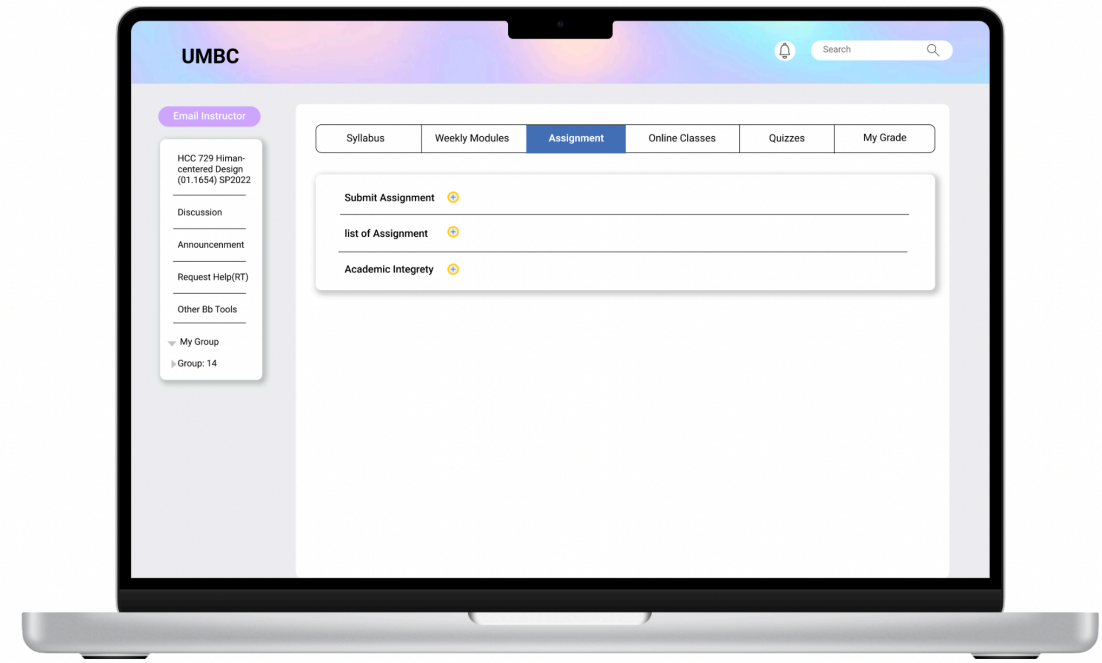


Figure 8: Homepage / Mid-fidelity

Courses page medium fidelity. The second medium fidelity prototype was course page. We tried to cover all the significant material for each course such as course syllabus, online classes session, my grades, etc. In developing the low fidelity prototype in the early stage we prioritized the consistency issue in the course page most. While we have shown our low fidelity prototype to a user, she liked the standardized outline of it. We also added more detailed information for assignment based on her request (Figure 9)



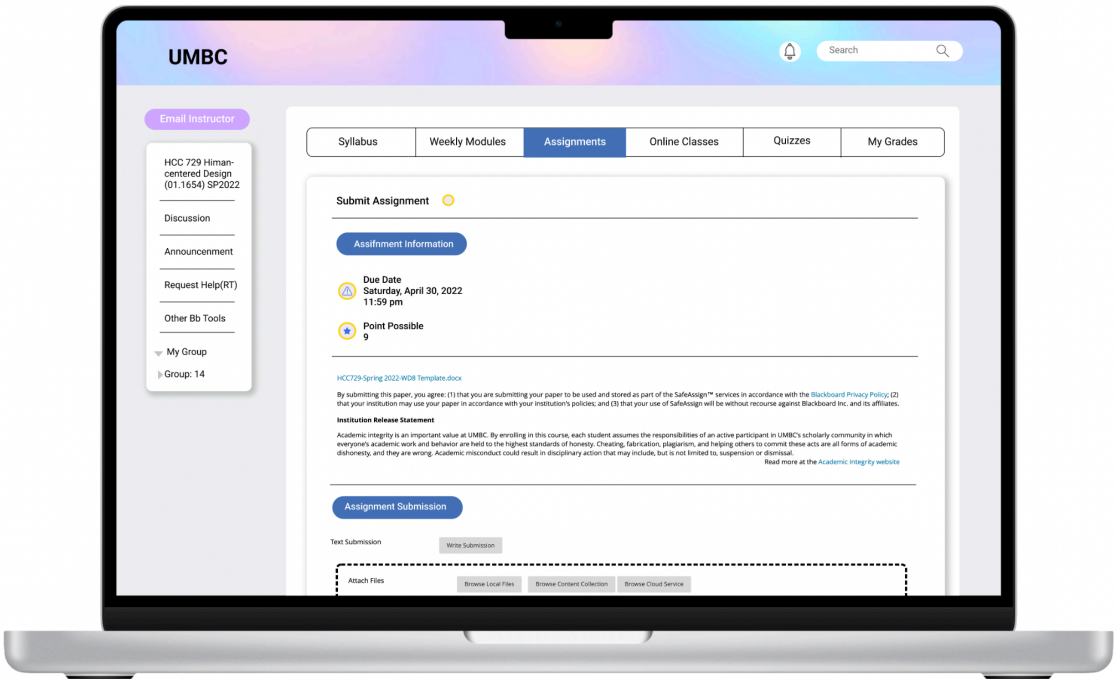


Figure 9: Assignment page / Mid-fidelity

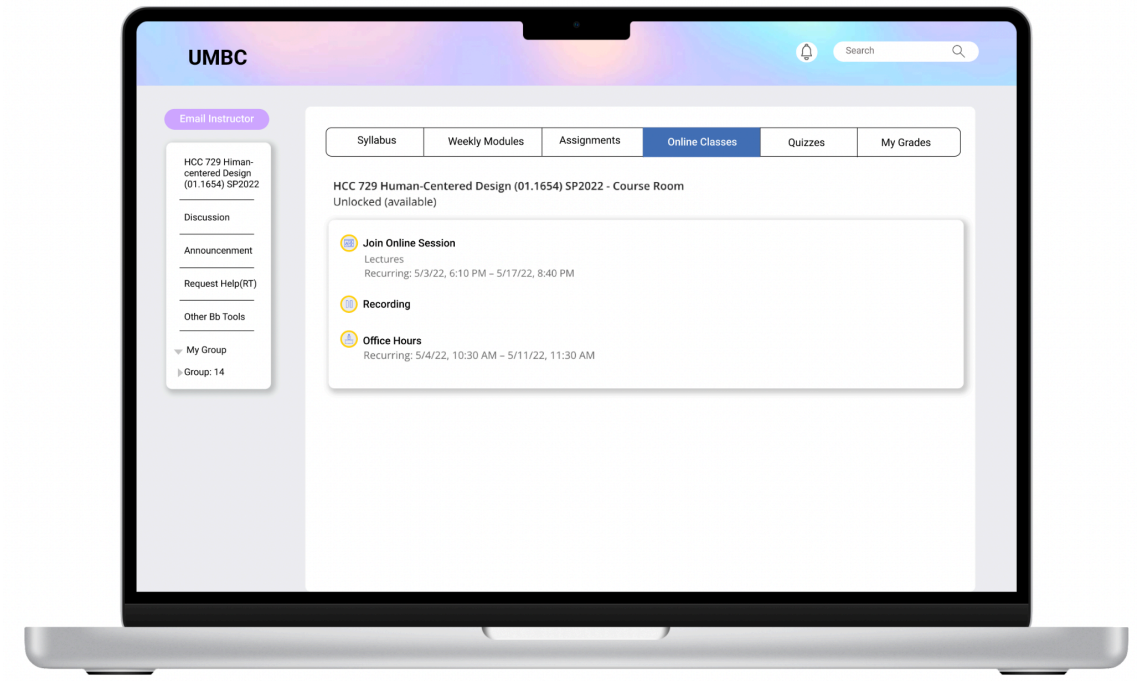


Figure 10: Online session page / Mid-fidelity

Discussion page medium fidelity. The last prototype was about an interactive discussion board page. For this section we tried to create a familiar experience for users . In addition we wanted to make the Discussion board interactive and inviting, to the users to participate in discussions. The user whom we have shown our sketches easily could relate the design to the familiar social media layout where he participates in discussions often. Based on a low-fidelity test we added a search box for the page. Users can add keywords in the search box to find desired topics more conveniently (Figure 11)

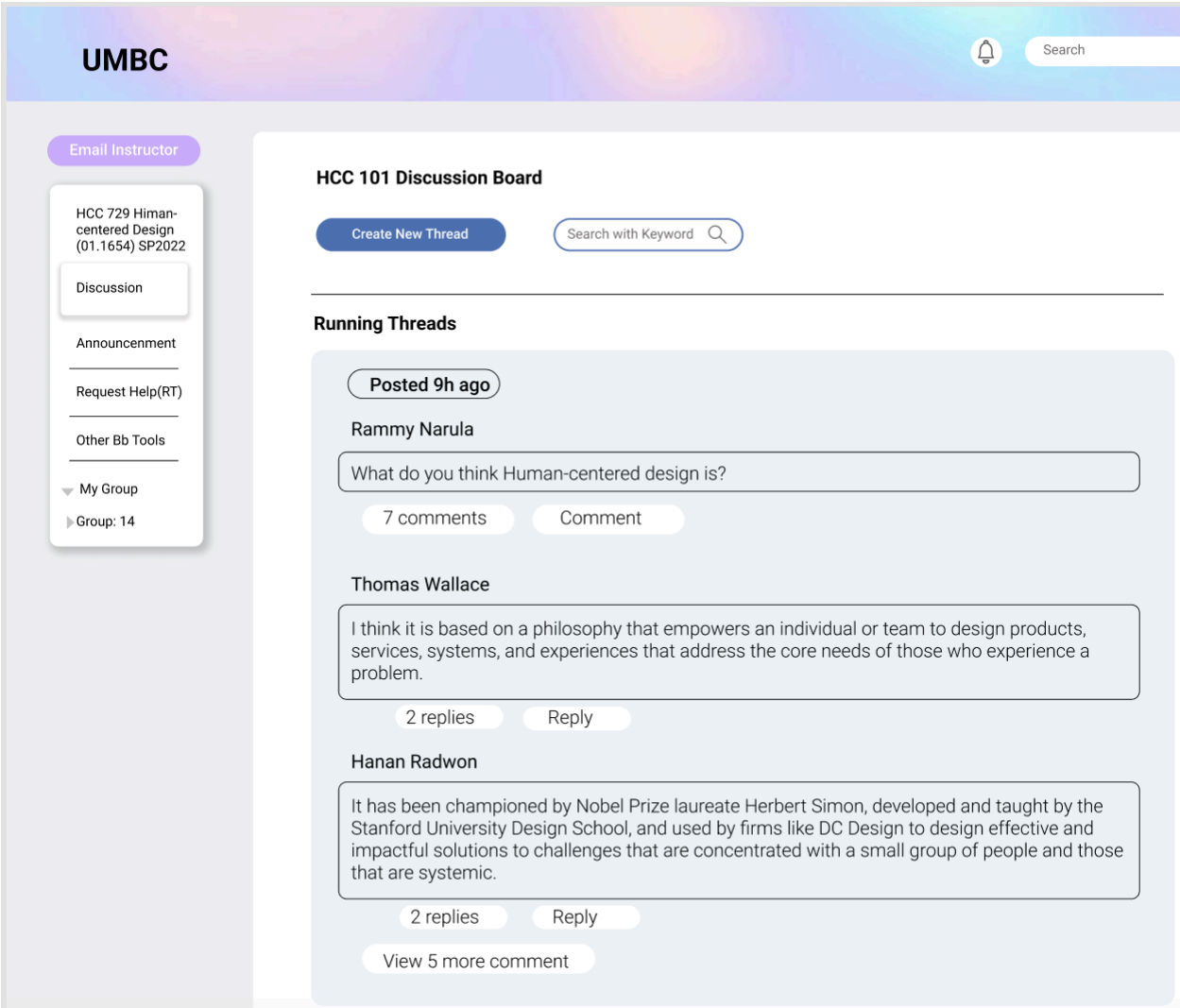


Figure 11: Discussion page / Mid-fidelity

Evaluation

For evaluating the Mid-fidelity prototypes, we have conducted cognitive walkthroughs. Cognitive walkthrough can be formally defined as “a task-based usability-inspection method that involves a cross-functional team of reviewers walking through each step of a task flow and answering a set of prescribed questions, with the goal of identifying those aspects of the interface that could be challenging to new users.” [1] The cognitive walkthrough was the most important part of our evaluation process. For carrying out the walkthrough, we followed the steps outlined by Dr. Ravi Kuber at the class which is:

- Giving the user a task to do.
- Observing the user performing tasks.

- Identifying what the user is searching for and whether there are issues with the process.
- Documenting what the user says and does on each web page.

The mid-fidelity prototypes were implemented at Figma [2] which is a vector graphics editor and prototyping tool. Figma also has the feature to test the prototype with the users by allowing them to interact with different pages of the prototype. We have conducted a comprehensive cognitive walkthrough with one user for all three prototypes. The participant in this case is a 27 years old (male) PhD student at the Information Systems department at UMBC who started using Blackboard approximately five months ago when he joined UMBC. He is comparatively a new user of Blackboard, but has to use Blackboard regularly for his courseworks. He has a course this semester which has a component of participating in the discussion board (not all courses have the discussion component). As we wanted to test all three prototypes with the participant, we selected him who had a course with a discussion component. Also, being a comparatively new user (using Blackboard for one semester), we thought he might provide us some insights about how it felt when he first used the website. We conducted the cognitive walkthrough with him for the three mid-fidelity prototypes with the Figma platform at UMBC library on a laptop computer. So, it was not a controlled lab environment rather like a place users may use the website in cases. We used a laptop device because, from our data collection phase, we came to know Blackboard is used on laptops mostly. We also designed our prototypes for laptop computers. Three tasks were implemented and observed in the cognitive walkthroughs. They are

- **Task 1:** Access to important information on the Home Page of Blackboard. Have a quick access to important deadlines, courses, and accessibility support via Homepage
- **Task 2:** Go to the courses. Look for each course material such as, course syllabus, online classes session, my grades, etc.
- **Task 3:** Go to the discussion board layout of a course at Blackboard and interact with it.

The cognitive walkthrough tables for the three prototypes are attached in the appendix section.

The cognitive walkthrough provided us with a number of valuable feedbacks. On top of that, it helped us to get an idea of how the system might be used in real life if the new design is implemented. This is important because it is tough to get a sense of the actual user flow with the system at the design phase. Another thing we wanted to get from the cognitive walkthrough to compare our intention in design and the goals of the user. In most part our designs were able to meet the user goals. The homepage design seemed straightforward to the user and he commented that it covers all the important components. we noticed that the user wants to access the all courses page at first and then wants to get to his desired course page. In time of logging into Blackboard, the

user wants to have a glance on the important dates which should be displayed in a clear interpretable way- which is supported by our design. Also the user gave an interesting suggestion to use to have different colors schemes for different deadlines based on their importance. For the course page, we tried to maintain consistency and that was also reflected in the cognitive walkthrough. We noticed that the user wanted to carry out the tasks like looking at syllabus, accessing online classes in a routined manner. Here, our intention to maintain consistency in the course pages and menu items served a positive role. For the discussion board prototype, our intention was to make the experiences interactive and inviting to the users to participate in discussions. At the data collection phase, we also found that the users are very familiar with using social media sites and were comparing their experience there to the experience in Blackboard. In that regard, we wanted to make the discussion experience familiar to the user by taking inspiration from the familiar social media sites. The user, at the cognitive walkthrough recognised that by mentioning how he could relate to the interface with his familiar experience. At one instance, the user liked the feature to be able to reply to comments but he thinks that “it might get complicated when there are so many comments and replies inside one thread.” Also, it seems like the option to view posts and comments at the same time gives the user a good idea about the topic and trajectory of the discussion and makes him interested in participating.

In an overall sense the cognitive walkthrough came out very insightful for us to evaluate our prototypes. The most important takeaway from these walkthroughs is to see whether our intentions and consideration in the design process matched the user goals in a meaningful way. In most parts we were happy to see positive results. Some feedback like using color schemes according to importance, ability to edit the profile, posts and comments could be implemented in the next iteration.

Recommendations

The evaluation phase revealed some valuable insights about the user’s goal and way of navigation. From the evaluation on the low fidelity prototypes, some of the recommendations from the users were to have color contrast for the assignment page, search box capability for the home page, having reply option for comments which we have included in the mid-fidelity phase. Evaluating the mid-fidelity prototypes, we have observed that for the home page, having clear, interpretable and comprehensive functionalities and information is important. The user’s suggestion to use different color schemes according to the importance of dates and deadlines is a great feedback to take into consideration. The ability to edit the profile and also the posts and comments in the discussion board is also interesting insights for us which can be kept in mind in the next

iteration. The consistency for the course page and the familiar interactive experience in the discussion board also reinforces our evaluation in the previous phase and our intention of design. We haven't observed any constant theme to be exact throughout the evaluation but the feedback was helpful.

Personal Reflection

We started the design phase with a rich body of data and insights that we have gained by going through the data collection and evaluation phase. Our goal was to design a better version of Blackboard which is easy and enjoyable to use, intuitive to learn and navigate and supports all stakeholders including the instructors, students, administrators with a great LMS experience. In doing so, we have selected three pages to work on, the home page, the course page and the discussion board at Blackboard. While brainstorming the ideas, alternatives and design prototypes, users and their experiences were the first consideration for us. The empathizing experience of constructing the personas and scenarios helped us the most to do so. It made us realize that if we have not collected enough data and insights previously, the design would not make sense.

Brainstorming about solutions, alternative ideas and sketching the prototypes in the low fidelity stage is such a fun experience. In this phase we felt that it is important to think broadly, considering as many options as possible but also being objective while selecting the one solution to implement in the next step. Then we brought the low fidelity prototypes that we have sketched to the actual users of the sites. This step is important to ensure whether we are in the right direction or not, after all the users would actually use the system in real life. These feedbacks helped us a great deal to come up with the mid-fidelity prototypes and for going for the cognitive walkthrough process for evaluation. The cognitive walkthrough was significant for us to really see whether our intentions in design are meeting the user goals or not. We were relieved to observe a mostly positive outcome of the design through this evaluation. We have also gained some valuable feedback too during the walkthroughs. We could not test the design with any person who needed the accessibility features which might have been good to have. However, we think the evaluation we did with the low and mid fidelity prototypes were comprehensive enough to get an overall sense of usability of our design.

Finally we should note that, during this course we worked on Blackboard website and tried to re-design the website and improve features to make it a more user-friendly platform. To do so, we focused on UX research and human-computer interaction study. We conducted deep research including the project background, research goals, research questions, users' needs and pain points, competitive audit, as well as creating

mockups, prototypes, and doing interactive user testing. We learnt different methods every week and tried to implement those methods into our project which helped us to achieve a good result.

References

[1] Salazar , K. (2022, February 13). *Evaluate interface learnability with cognitive walkthroughs*. Nielsen Norman Group. Retrieved May 10, 2022, from https://www.nngroup.com/articles/cognitive-walkthroughs/
[2] https://www.figma.com
[3]https://www.blackboard.com/teaching-learning/learning-management/blackboard-learn

Appendix

Cognitive Walkthroughs

Participant No: 1; Task 1: Access to important information on the Home Page of Blackboard. Have a quick access to important deadlines, courses, and accessibility support via Homepage

	What was the user's goal? (Do NOT use one word answers)	Is the action available? (Do NOT use one word answers)	Does the action or label match the goal? (Do NOT use one word answers)	Is there good feedback? (Do NOT use one word answers)

1	To look for the important deadlines for courses on the Blackboard website	Students can check important deadlines such as, weekly assignment, quiz, mid-term, and final term on the first page of the website. After they login to the website the first information they faced is course deadlines.	Students can find the deadlines on the first pages. However, they cannot submit assignments or participants to comprehensive quiz sessions through the home page.	Yes, participant mentioned the home page is straightforward and covers all important information. The home page is clean and tidy, however, upcoming deadlines does not have enough contrast with background and some user can miss the section
2	To look for the important deadlines for courses on the Blackboard website	Students can check important deadlines such as, weekly assignment, quiz, mid-term, and final term on the first page of the website. After they login to the website the first information they faced is course deadlines.	Students can find the deadlines on the first pages. However, they cannot submit assignments or participants to comprehensive quiz sessions through the home page.	Participant requested to have a bold date for the deadline, also to have different colors scheme for different deadlines based on their importance.
3	editing personal profile	There is brief information about students on the home page. For editing personal profile they need to click their name on the left menu bar.	There is no features to edit profile via home page	The participant thinks that being able to edit a profile through the home page.

4	User wanted to access to the courses quickly	All the current courses are demonstrated on the first page, student can click on each course and access to all of the details for each course	Clear section available for accessing courses.	No feedback for accessing current courses.

Participant No: 1; Task 2: *Go to the courses. Look for each course material such as, course syllabus, online classes session, my grades, etc.*

	What was the user's goal? (Do NOT use one word answers)	**Is the action available? (Do NOT use one word answers)**	**Does the action or label match the goal? (Do NOT use one word answers)**	**Is there good feedback? (Do NOT use one word answers)**
1	Look for syllabus and instructor personal information	There is an option for students to send email to the instructor on the left-corner of the page. They can access to weakly syllabus via each course page	There is a small section on the page to send email. Also, instructor information is demonstrated on the syllabus page	Participant reported that the syllabus page is very originated and straightforward
2	Access to assignment information	All important details about assignment indicated at first section	The first section of assignment is very helpful for student to inform about weekly assignment details	We received feedback that accessing to assignment page and detailed information is easy and smooth

3	Try to join for online course session	There is a section for online classes, that help student to join online session and be able to check previous recorded videos	Online classes section is a perfect match for the stamener of the goal	We did not received feedback for joining online courses section

Participant No: 1; Task 3: Go to the discussion board layout of a course at Blackboard and interact with it.

	What was the user's goal? (Do NOT use one word answers)	**Is the action available? (Do NOT use one word answers)**	**Does the action or label match the goal? (Do NOT use one word answers)**	**Is there good feedback? (Do NOT use one word answers)**
1	Find a way to connect to discussion section of the website	Once opened the course page, there will be discussion section on the hamburger menu of the website	Clear label available for discussion section. This part allow students to ask questions and indicate all comments from students and instructors	We received feedback like Accessing the Discussion page is easy and smooth.
2	Adding a new thread for conversation in the Discussion board	The 'Create new thread' button is in a prominent place in the page and very visible.	The 'Create new Thread' button opens a space for the user to write his/her text for a new discussion thread.	The participant thought this thread creation and posting experience is very similar to social media sites.

3	Adding a comment in a existing thread	Under each thread post there is the 'comment button' visible. Also showing how many comments have been posted in a button beside 'comment' button	The 'Comment' button allows the user to comment on a post.	The post and some comments visible and readable at the same time is a good thing- commented by the participant.
4	Replying to a comment inside a thread	There is a 'Reply' button associated with each comment.	The 'Reply' button allows the user to reply to a comment inside a thread	The participant thinks that being able to reply to a comment is good but it might be complicated when there are so many comments and replies.