Project 3: Canvas (Desktop) UI Redesign

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DSGN 1 Fall 2022
Group 25
11 AM Studio

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Section I: Data Collection

Part A: Brainstorming

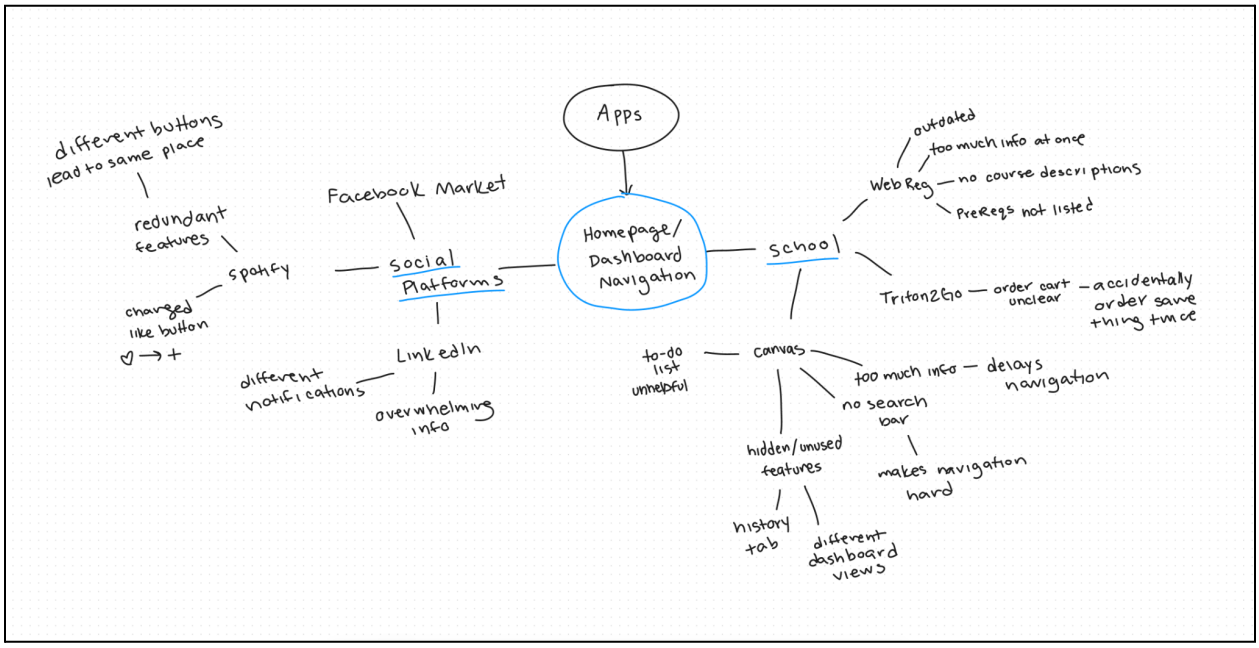


Figure 1. *Structure of Everyday Web Applications Mind Map*

- Using a **mind map**, our team brainstormed various products that we often had trouble using. We collectively decided to study Canvas (Desktop), an online learning management system that allows students to access course materials posted by their instructors. We considered the user workflows and hassles involved with many other apps such as Spotify, as well as many school-related apps like the UCSD app and WebReg website. We ended up choosing Canvas over other apps because its usage is so prevalent by students and our team agreed that Canvas was difficult to navigate with its abundance of unnecessary **affordances** and lack of corresponding **signifiers** and meaningful **constraints**. However, we wanted to investigate whether or not typical users would feel differently. More specifically, we are investigating the navigation of various user workflows, such as submitting an assignment from the home page of Canvas.

Part B: Methodology

- Our team decided to conduct a mix of in-person and online interviews in order for us to observe the users' interactions and errors with Canvas in real time. To ensure

unbiased results, we interviewed UCSD students on campus, as well as friends and classmates with a consistent set of questions to smoothly guide our interview format.

- In our interviews, we followed the **Master-Apprentice Model** in order to give the user a comfortable space to explain their actions without feeling inferior or that they lack knowledge. We chose to ask open-ended questions to avoid the possibility of any of our biases or prior knowledge affecting the results. This technique also allows us to learn from the interviewees about the design of Canvas and the multiple approaches of achieving the same result in many cases.
- **Data Collection:** In-person interviews, collected data on **this Google Form**
- **Results:** Collected on **this Google spreadsheet**

Interview Questions:

Pre-Task

Goal: We want to gauge the user's familiarity with Canvas and gain an understanding of their general thoughts on the website, as well as discover what the primary purpose of Canvas in their day-to-day life is.

Questions

1. How often do you use Canvas?
2. What device do you primarily use Canvas on?
3. What are the main reasons you use Canvas?
4. How long do you typically spend in a session on Canvas?
5. What are the main features on Canvas that stand out?

Task (Walk Through User Workflows)

Goal: We created a set of tasks that would replicate the typical procedures involved with a user completing course requirements on Canvas, such as receiving and submitting an assignment. All these tasks are timed and we have the user start from the home screen of Canvas (Dashboard) before starting each task. Timing the tasks ended up being a strong metric to give us quantitative data and allow us to calculate how long navigating through various features of Canvas takes. In our initial draft for our user interviews, we began by attempting to score these tasks based on the number of user clicks to achieve their goal. We realized that this metric is highly variable per user due to potential misclicks or exploration of additional pages before going through the proper workflow fully. With our set of curated tasks, we were able to cover a breadth of the core features that are offered by

Canvas and expose recurring user errors to gain insight for our analysis into poorly designed features and unintuitive aspects of the web platform.

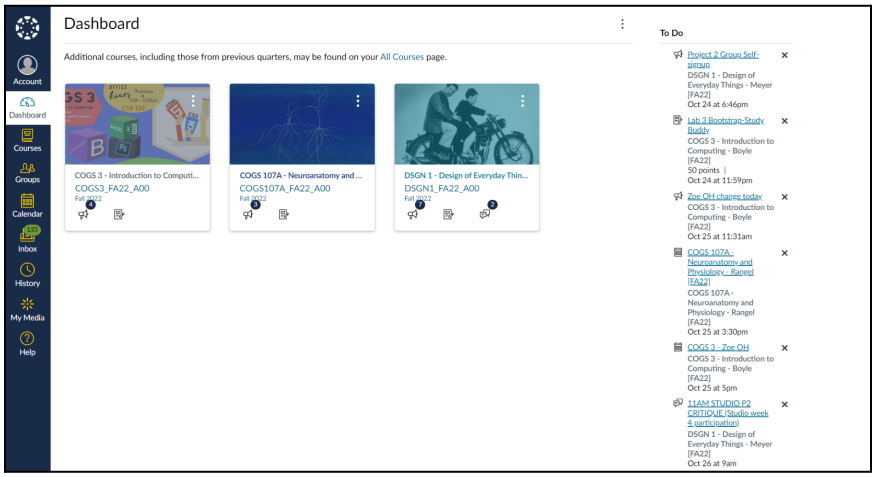


Figure 2. *Canvas Dashboard (Card view)*

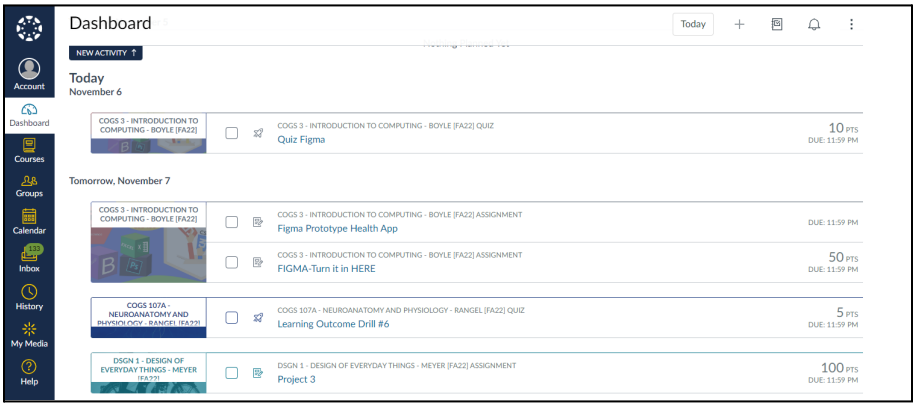


Figure 3. *Canvas Dashboard (List view)*

<u>Questions</u>

1. Walk me through the process of checking all of your upcoming assignment deadlines.
    - We asked this question in order to investigate how a user keeps track of what assignments are due. This will reveal the **mental model** of which behaviors different icons and links on the dashboard **afford** to do, as well as any **knowledge-based mistakes** where the user does not understand what the icons are supposed to **signify**.
    - We paid specific attention to: Does the user view the Assignment or Calendar page?

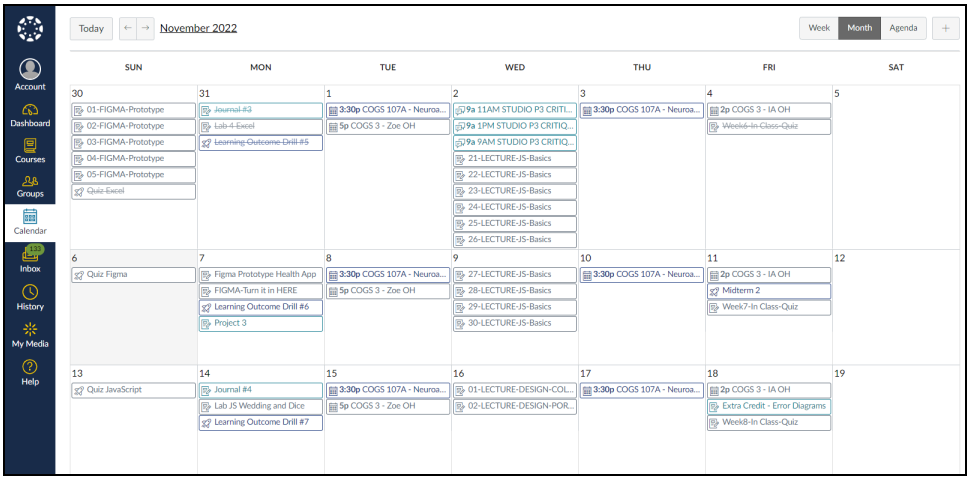


Figure 4. *Calendar feature on Canvas*

2. Walk me through the process of emailing your professor for one of your classes.
    - Our team asked this question to see how a user would act if they needed to ask their Professor a question about an assignment. Canvas has an Inbox feature that allows a user to directly contact all of their professors from the dashboard. However, users may be unaware of this and go to each course page to email their Professors. This task will check for **knowledge-based mistakes**.
3. Walk me through the process of joining a course group for an upcoming project.
    - This task is not immediately accessible on the dashboard or global navigation bar – a user must go to a course page instead. This may cause **knowledge-based mistakes** in the user if they are unaware of this and try to join a group using the "Groups" tab on the global navigation bar, which solely displays your current groups.
4. Walk me through the process of viewing material from last week.
    - This question may reveal several **action-based slips** in which the user intends to perform an correct action, but makes an error in execution. For example, a user may have a **capture slip** when they are scrolling through the page of modules/links and scroll past where they wanted to click.
    - We paid attention to: Does the user look through modules on the page? Their dashboard? etc.
5. Walk me through the process of submitting an assignment.
    - Since this feature may not be immediately accessible on the dashboard (depending on what view their dashboard is in, as well as if assignments are displayed on their To-Do list). Because of this, the user may have a **capture slip** in which they continuously click through links and modules and accidentally pass the target page.

6. Walk me through the process of checking all your grades?
    - We asked this question to invoke possible **knowledge-based mistakes**. Users may have a lack of knowledge about the gradebook menu that is on the dashboard of Canvas. Additionally, because the location of the grade menu changes between Card View (bottom of page) and List View (top of page) of the dashboard, this task may invoke a **mode error** where the user navigates to the correct area where they can check their grades, but they are simply in the wrong dashboard mode.

Figure 4.1. *Canvas UI of a gradebook icon which displays all grades at once (List View)*

Post-Task (Retrospective)

Goal: We want to immediately gauge the user's emotions and see whether or not navigating through the website was a positive or negative experience. We also hope to see what parts of the website led to a positive or negative experience. Lastly, we want to get a sense of the user's **mental model**.

Questions

1. What areas of the website were intuitive and easy to use?
    - This question will allow us to see if the various **affordances** of the Dashboard are perceivable, as well as if the icons are comprehensible **signifiers** of these **affordances**. Additionally, this will reveal if the website gives effective **feedback** to the user about what action they performed, such as changing the page layout or highlighting the tab they clicked into.
2. What are some potential features you'd like to see added?
    - Because the goal of this project is to study a user's problems with Canvas, we asked this question in order to help us create a **human-centered design** in our redesign. Gaining insight into what a user would personally like to see implemented to make their experience more enjoyable allows us to truly focus on human needs.
3. What areas led to the most confusion?
    - We chose this question to see if the user was able to seamlessly cross the **Gulf of Execution**. This question will reveal weaknesses in the Canvas

dashboard and navigation design, such as hidden **affordances** that are due to non-universal **signifiers** or lack of **signifiers** at all. It may also display how easily they could cross the **Gulf of Evaluation** as they assessed the outcome of their actions. This may reveal a lack of **constraints** in the design if there are too many **affordances** that overload the user, or a lack of **feedback** that confuses the user as they navigate the site.

4. Was there anything in the behavior of the website that surprised you during the tasks?
    - We asked this question in order to gain insight into the user's **mental model** of Canvas. If the outcome of their actions was different from their expectations, we will be able to see if their mental model was correct and categorize their errors as **slips** or **mistakes**. Understanding their knowledge about the website will also help us to classify the types of slips/mistakes they are making.
5. How are you feeling? (what's their overall experience of the tasks given, 1 - happy, 10 - frustrated).
    - This last question will allow us to gauge whether the user's experience with the site is more positive or negative. Data may be able to reveal a possible relationship between the number of errors and how frustrated the user is by the end of the tasks.

Part C: Proof of Data

As we described in Methodology, we created a Google Form to record data from our user interviews and allow for organization in a table. The data from these Form responses was stored in a Google sheet to quickly analyze data for each question or collect other statistics.

- **Data Collection:** In-person interviews, collected data on **this Google Form**
- **Results:** Collected on **this Google Spreadsheet**

Notable Data Points::

- Checking grades: Median time of 26.14 seconds and Mean of 35.75 seconds
    - 8/11 of interviews did not immediately know about View Grades (seeing all grades at once)
- Checking Todo: Median time of 18.5 seconds and Mean of 15.725
    - The provided todo list on the right side is muddled with irrelevant information like announcements and discussion information
- Emailing Professor: Median time of 22.3 seconds and Mean of 28.28 seconds
    - 7/11 Interviewees did not use Canvas Inbox

- Joining course group: Median time of 25.01 seconds and Mean of 41.27 seconds
    - 5/11 Interviewees did not know how to join a group

Part D: Contributions

Data Collection

- Mindmap: Jaylynn
- Google Form: Aaron
- Methodology: Our entire team brainstormed and refined the questions for interviews during Studio and lecture time, as well as the reasoning behind each question.
- Jaylynn: conducted Interviews # 1, 2, 3
- Aaron: conducted Interviews # 4, 5, 6
- Yang: conducted Interviews # 7, 8, 9
- Faris: conducted Interviews # 10, 11

Error Analysis

- Identify Errors: Aaron
- Error Classification: Aaron
- Patterns & Trends: Faris & Aaron
- Trade-Offs: Faris, Aaron, & Jaylynn

Design Space

- Design Space Chart: Yang
- Lo-Fi Redesign: Faris, Aaron, & Jaylynn
- Justify Redesign: Faris, Aaron, & Jaylynn
- Redesign Tradeoffs: Entire team

Section II: Error Analysis

Part A: Identify Errors/ Error Classification

While conducting the interviews, we took note of the interviewee's mistakes and slips while navigating through the appropriate pages to complete their task. While completing the task of checking all grades, 8 out of 11 of the participants did not immediately know about the "View Grades" button. This **knowledge-based mistake** highlights a flaw in Canvas's design in which users are unaware of a useful feature. Additionally, the participants had a median task completion time of 26.14 seconds and mean time of 35.75 seconds. This extremely long time to navigate such a basic feature that would normally take no more than 5 seconds, as shown in Figure 5.1., shows that Canvas also offers poor **discoverability**, as the users failed to discover the view grades feature in a quick time. There are two reasons for the user's lack of knowledge in regards to the "View Grades" button. One reason is because the "View Grades" button is not immediately in view on the Dashboard (Home) page. Instead, the user must scroll all the way down to find the "View Grades" button located at the very bottom right. The second reason is that the user typically has no motivation to scroll down on the Dashboard page to begin with. The Dashboard offers scrolling because the To Do list on the right takes up so much vertical space that it creates a vertical overflow. However, because of the To Do list's poor design, users typically don't look through it and consequently don't bother scrolling down.

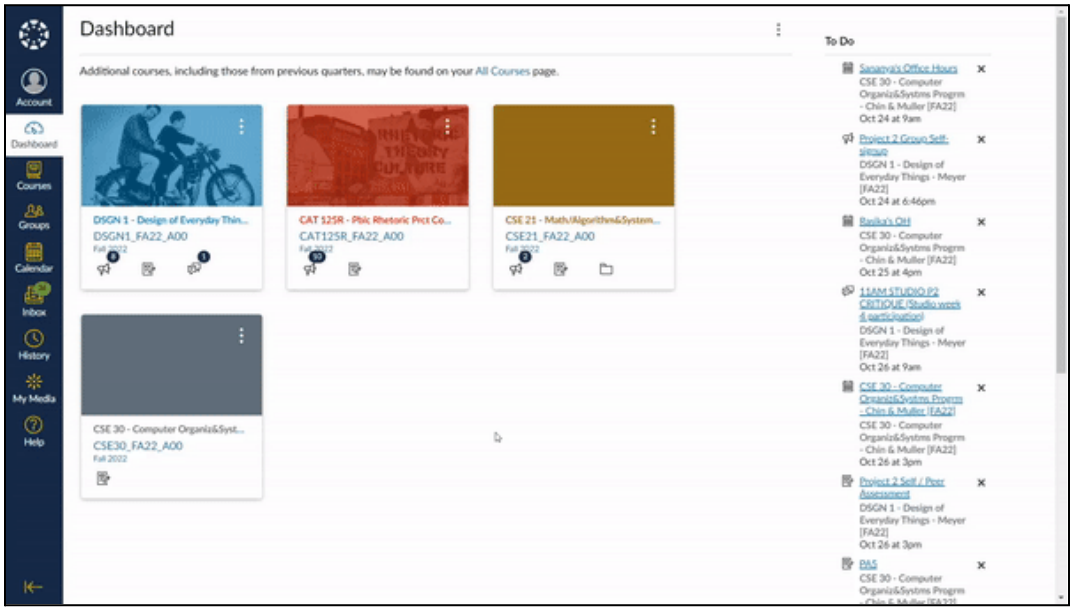


Figure 5.1. *Demonstration of completing the first task ideally: viewing all grades*

The To Do list's poor design is reinforced by the second task where users were tasked with checking for upcoming assignment deadlines. The participants had a median task completion time of 18.5 seconds and mean time of 15.725 seconds. Rather than looking at the To Do list on the right side of the Dashboard page, 6/11 of the participants used the Calendar instead and 3/5 of those that did use the To Do list reported that it was confusing because it was cluttered with excess information such as Office hours times and other announcements that are not considered assignments to be completed as shown in Figure 5.2. This shows that the To Do list has poor **signifiers**. Because although the **signifiers** provide a lot of information including upcoming assignment deadlines and to-do items, it provides an overload of information. In fact, there is so much information that the user does not bother to look over it even if it contains the information they are trying to look for. Additionally, it is clearly a **knowledge-based mistake**, as a majority of the users did not refer to the To Do list and instead opted for the Calendar page instead.

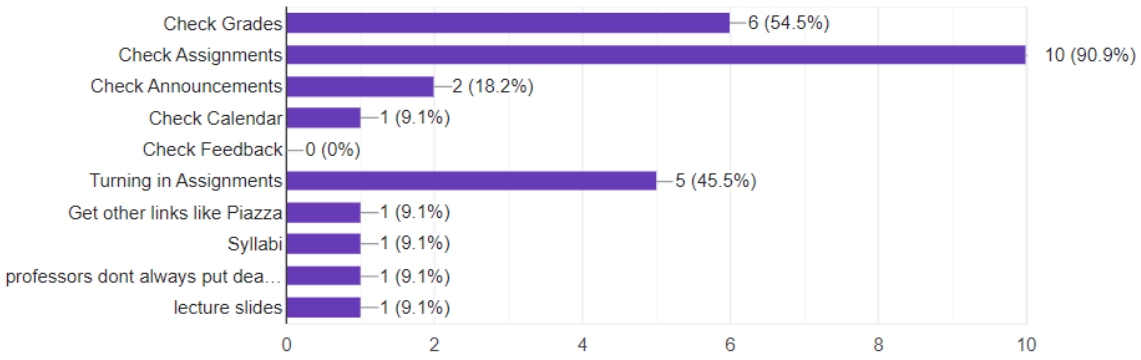


Figure 5.2. Data showing primary reasons for using Canvas

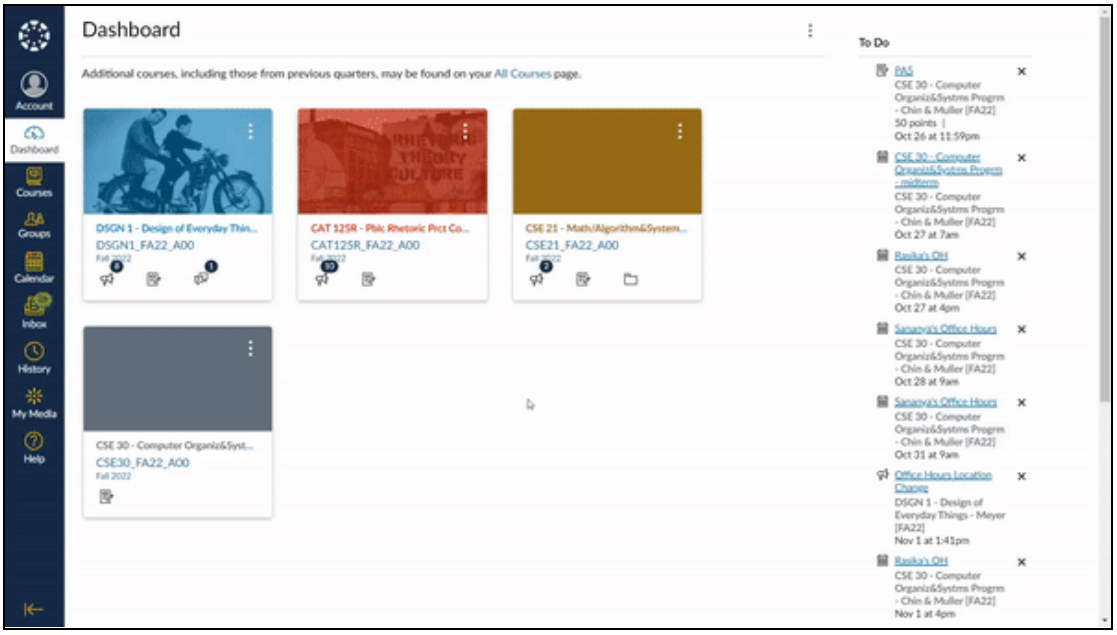


Figure 5.3. *Demonstration of completing the second task optimally: viewing upcoming assignments. Also shows Calendar page*

Another example of a **knowledge-based mistake** for Canvas's Desktop website is the inbox page. When tasked with emailing the professor, 7/11 interviewees did not use the inbox page and instead had to find the professor's email using the Class syllabus or looking through their Gmail. The participants had a median task completion time of 22.3 seconds and a mean time of 28.28 seconds. This **knowledge-based mistake** can be attributed to the fact that "Inbox" is not a good **signifier**. The user is not able to immediately recognize that the Inbox page affords sending out emails to professors. Instead, the user may falsely believe that the Inbox page only affords reading announcements or messages. This shows that the users have a poor mental model of how the Inbox page works.

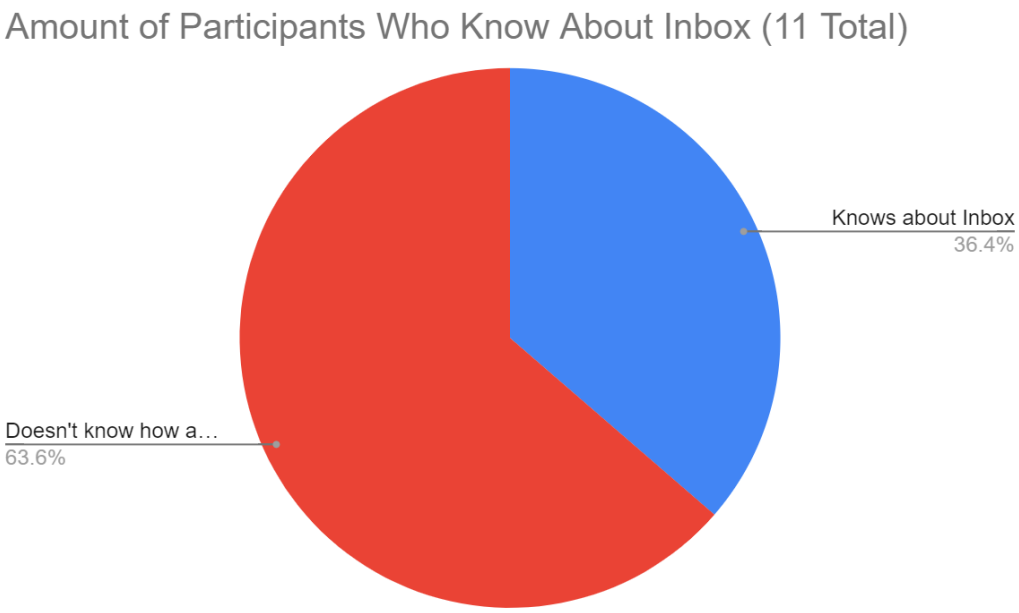


Figure 5.4. Pie Chart showing distrubtion of participants who know how to use Inbox

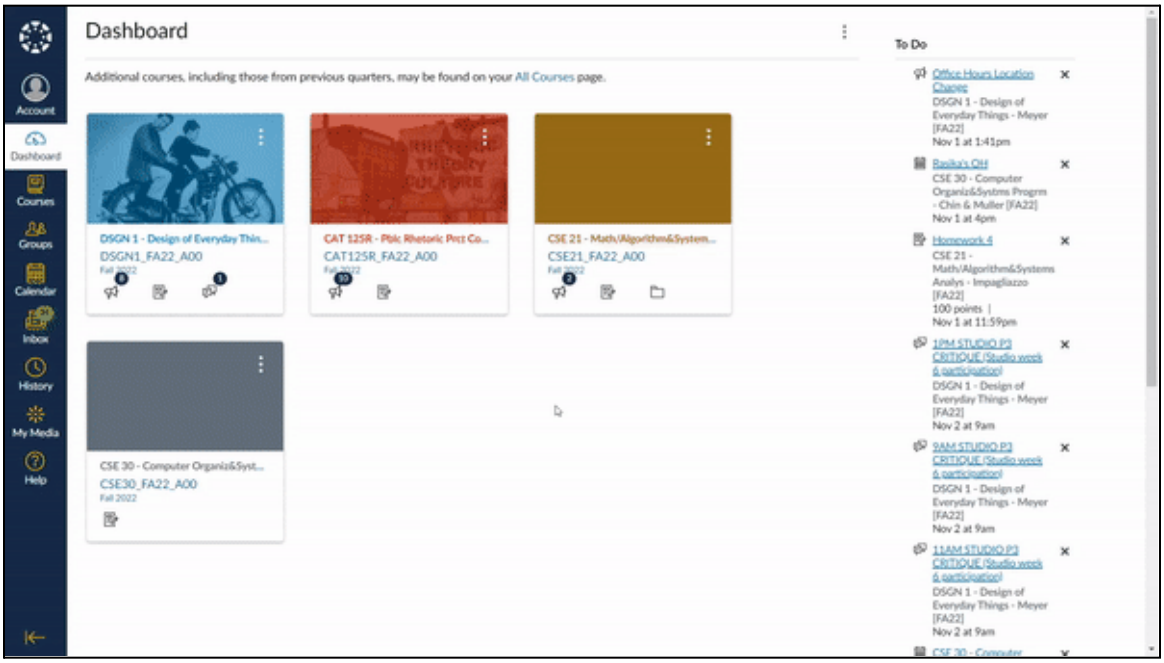


Figure 5.5. *Demonstrates how to complete task 3: emailing professor*

The most notable error many of the participants made was when they were tasked with joining a group for any course. 5/11 of the interviewees had no idea how to join a group. Additionally, the participants had a median task completion time of 22.3 seconds and a mean time of 28.28 seconds. We observed that the users made **knowledge-based**

mistakes, as they did not know how to navigate to the page to allow them to join a group. Additionally, 3/11 of the participants were able to view the groups they were in by clicking on the groups icon on the navigation bar, but they were unable to join a group as shown in Figure 5.4.. This misleading **signifier** creates a disconnect between viewing and joining a group which fails to bridge the **Gulf of Execution**, as users do not have a strong **conceptual model** of working with Canvas groups.

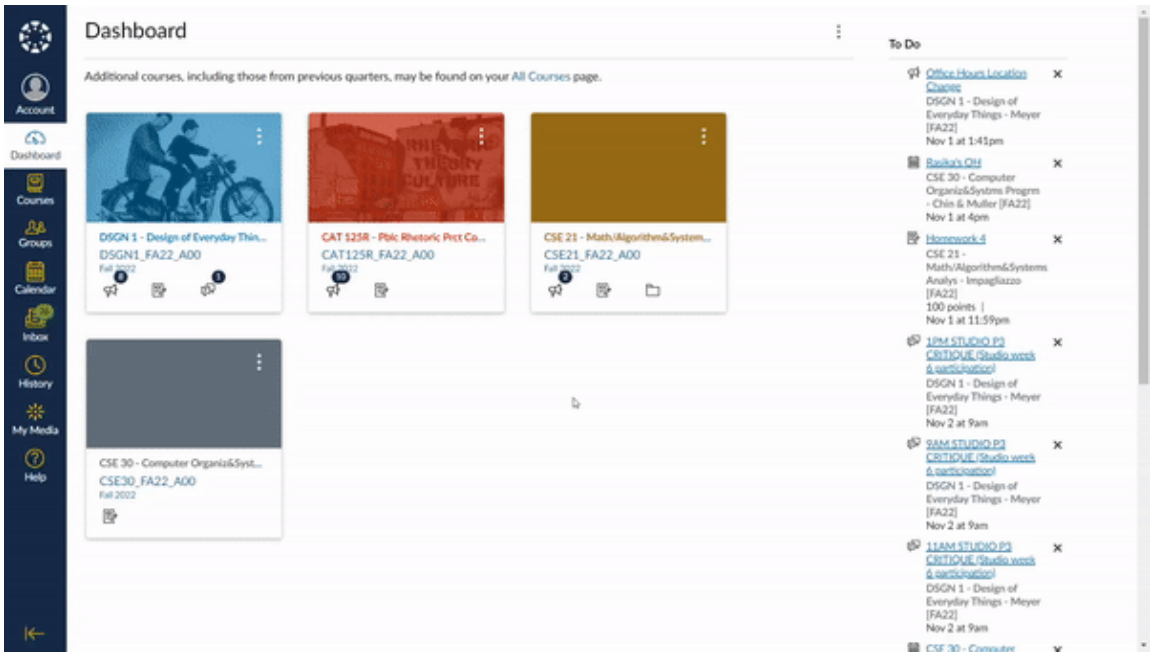


Figure 5.6. *Demonstrates users mistaking groups on navigation bar to allow them to join a group*

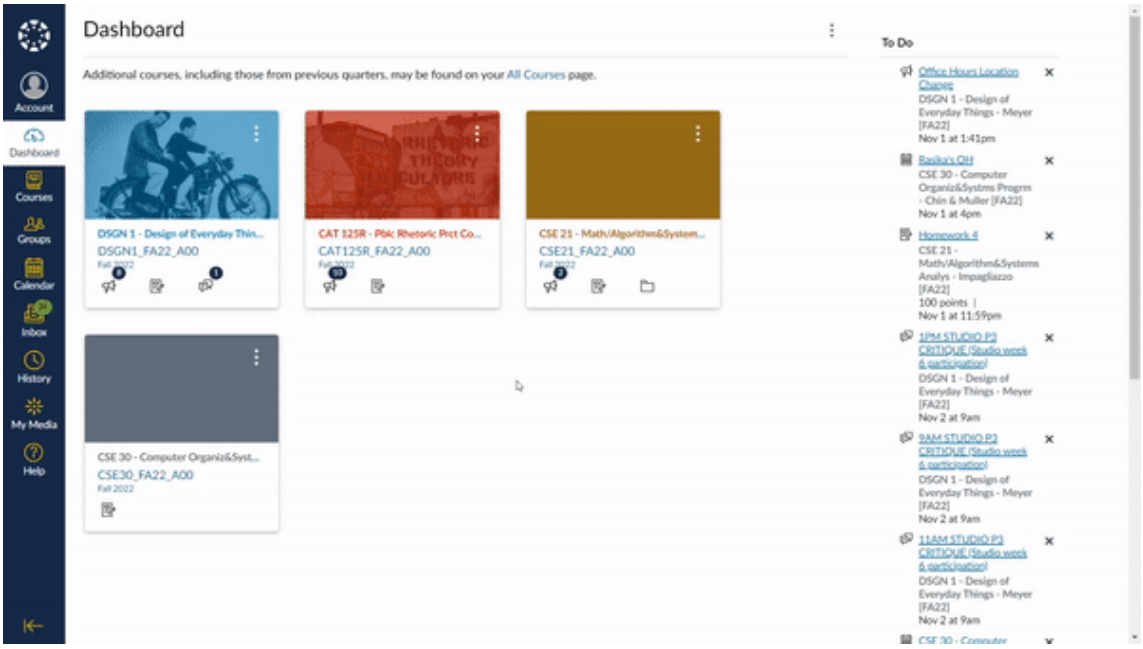


Figure 5.7. *Demonstrates how to complete task 4: joining a group*

Part B: Patterns & Trends

From the user interviews conducted, the information we discovered was that Canvas as a platform is incredibly feature-rich with the **affordances** it provides to its users. As a platform for managing educational courses, it allows for most of the required usability that professors and students alike need. However, the most recurring trend was that the various **affordances** lack proper **signifiers** and user workflows to properly utilize their behaviors. The vast majority of users in our interviews failed workflows due to **knowledge-based mistakes** because it's impractical to have real users fully grasp all of the features available to them. Throughout the platform, many similar features ended up in different sections with no relation such as the UI to view groups being fully isolated from the UI to join a group.

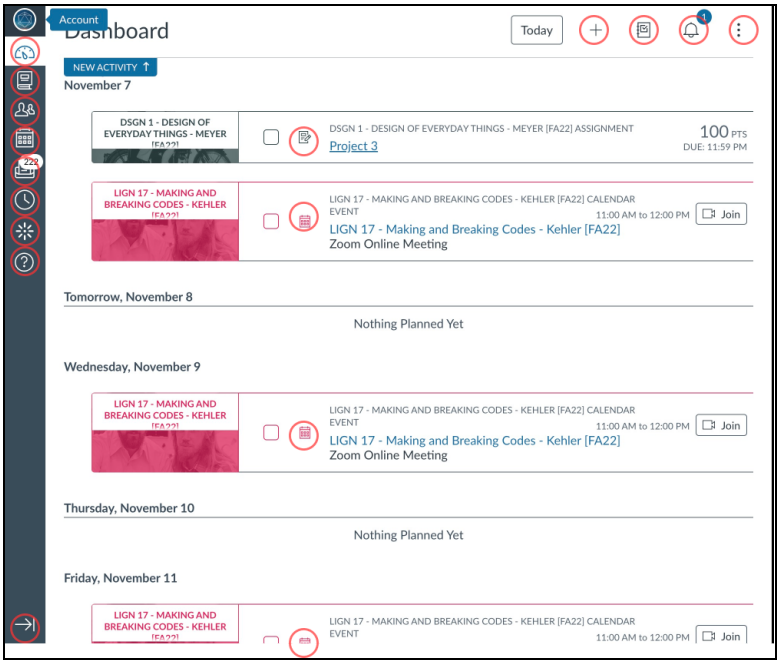


Figure 6: *Canvas's Home Page UI Relies Heavily on Icon-Only Signifiers*

Another common trend seen in Canvas's existing UI is the preference towards icon-only buttons. While this is a useful option in many cases to preserve space, the amount of **knowledge-based mistakes** seen by our users points towards the fact that Canvas has exceeded the limitations of this tool, thus reducing the ability of icons to properly **signify** any information intuitively and confusing many users towards the intended goals of various features. These poor **signifiers** failed to communicate their **affordances** to the user.

Part C: Trade Offs

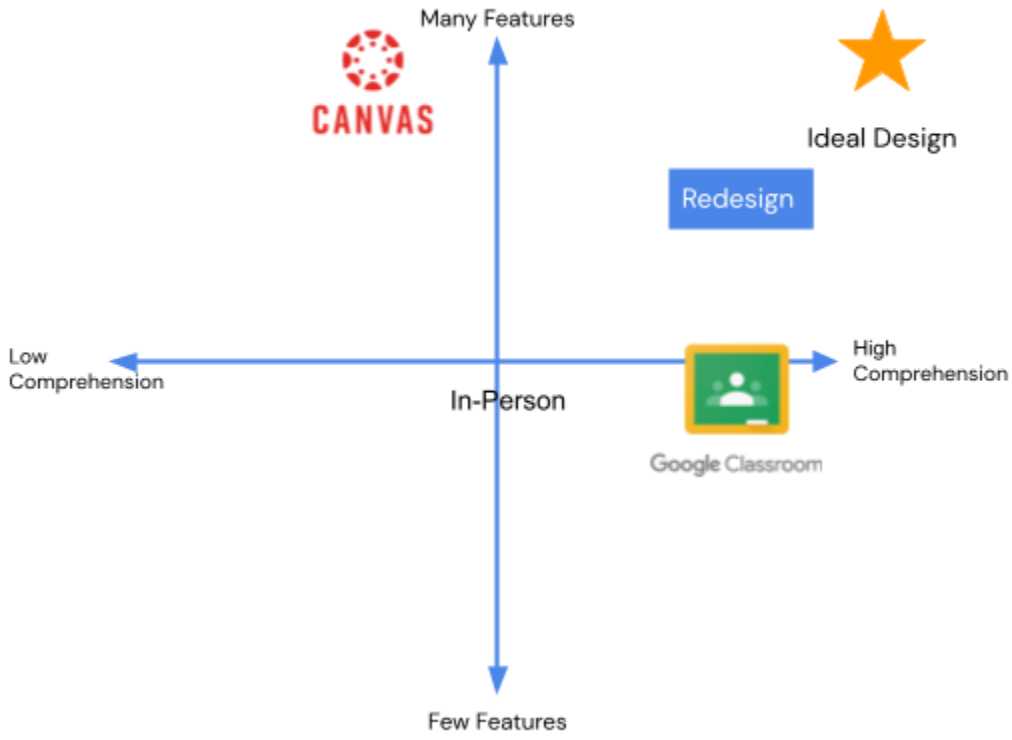
Using the current live UI for Canvas, we see a large trade-off between comprehension and **discoverability**. The platform placed a high emphasis on discoverability by locating many features directly on the main dashboard through icon buttons and sub-menus, however this overflow of information makes it highly unlikely that most users will take any steps to interact with every element and discover the full set of **affordances**.

Section III: Design Space & Redesign

Part A: Design Space Chart

Comprehension vs Features

While analyzing the trends and problems from our user interviews, we discovered that there is a major trade off between comprehension of features and amount of features.



	Comprehension (1 = low to 5 = high)	Features (1 = few to 5 = many)
Canvas	2	5
Google Classroom	4	3
In-person	3	3
Redesign	4	4
Ideal Design	5	5

Canvas

Canvas has a large amount of features, offering many functions that in person instructions can't. For example, students can organize their schedules easily and submit their homework remotely. For this range of functions, we placed it at 5 in terms of features. While having many features can be convenient, it can also become overwhelming, reducing its ease of comprehension. Many first time users might have a hard time crossing the **Gulf of Execution** as they are confused as to what features correspond to what goal, which is why we placed it at 2 in terms of comprehension.

Google Classroom

Google classroom offers a place for students to attend to remote instruction, and it is fairly intuitive because of its distinct features that users may have experience of from other Google applications (such as uploading files and folders). For this reason, we placed it at 4 for comprehension. However, the function is limited as Google Classroom only **affords** major functions like uploading assignments and checking grades, as opposed to Canvas that allows for collaboration in groups or emailing through the application. This is why we have placed it at 3 in the scale of features.

In-person

In-person instruction comes with the essential functions of directly communicating with students and professors, as well as being assured that you have submitted an assignment when you hand it in. However, this system **affords** few functions because time and space is limited, as opposed to the endless possibilities of features on a web application like Canvas. This is why we placed it at 3 in terms of features. Comprehension is also limited because a student is forced to go into class in-person, forcing them to understand the system of completing an assignment and relying on their memory. This can be confusing for students because their relying purely on their memory can lead to many errors and is much less organized in comparison to using an online platform where all the instructions and information are organized and saved in history.

Redesign

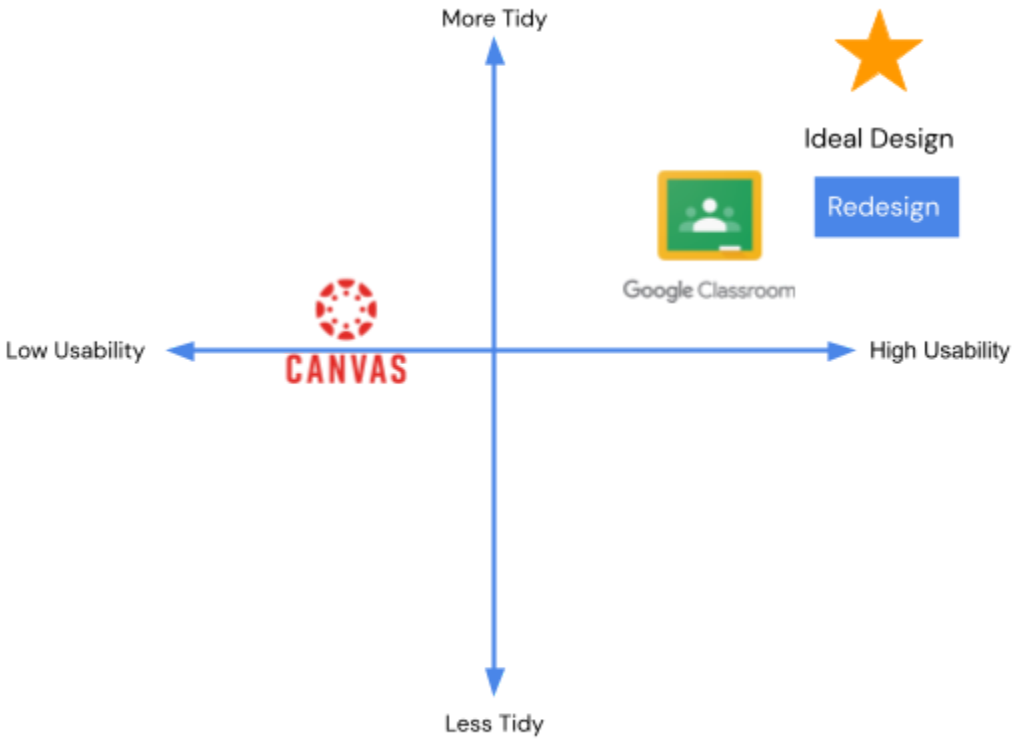
Our redesign was based on errors users committed using the original Canvas system . We placed the main functions of Canvas on the dashboard while hiding the less frequently used functions. Although this will help to increase the website's comprehension, as there is less information necessary to understand, the amount of features that can be immediately accessed are reduced. This is why we placed both comprehension and features at 4 for our redesign.

Ideal Design

An ideal web design would be able to incorporate many **affordable** features while making the design efficient and comprehensible.

Usability vs Tidiness

Our design process revealed a tradeoff between usability of the website and the tidiness of visual layout of the design. To make every function easy to navigate to, Canvas includes various icons and links as **signifiers** to its various functions. However, this compromises the aesthetics of the design because of the added visual elements and may increase the number of clicks a user takes to reach their destination.



	Usability (1 = low to 5 = high)	Tidiness (1 = less to 5 = more)
Canvas	2	3

Google Classroom	4	4
Redesign	4	5
Ideal design	5	5

Canvas

During our interviews, users would need several clicks to navigate through several pages to reach their target page, such as how users would check individual pages for all their grades rather than using the grade menu. Because of how common **knowledge-based mistakes** were within our observations, we placed it at a 2 for usability. The website is somewhat tidy in that there are divided sections for a student's courses as well as the website's various features. However, a class that requires materials and different outside links to finish assignments can clutter the Canvas pages, so we placed it at 3 for tidiness.

Google Classroom

Google Classroom, due to its minimal design and small number of features relative to Canvas, there is high usability. It is reasonable to place it at 4 for usability. Additionally, its simplistic and minimal amount of visual elements on the website gives it a 4 for tidiness.

Redesign

Our redesign of Canvas allows for greater usability of features on the home page than the original design because the icons and buttons are more meaningfully defined. Additionally, we included direct access to features such as providing the users the ability to immediately see their grades and to-dos, minimizing the need for clicks to navigate to their desired page. Because of this, we gave our redesign a 5 for usability.. For tidiness, our redesign is laid out into four main parts: navigation bar, to-do list, announcements, and courses. The large number of functions our participants stated they used Canvas for drove us to include those many features, such as checking for upcoming assignments and grades. This drove us away from creating a more aesthetically pleasing, minimalist web page as we placed value in the function of the site. However, we created the layout to be as intuitive as possible for users, so we placed it at 4 for tidiness.

Ideal design

An ideal design will be a system that has clear **signifiers** that point to the product's many features while also having a minimal design.

Part B: Lo-Fi Redesign

Figure 7: Redesigned Homepage UI Components

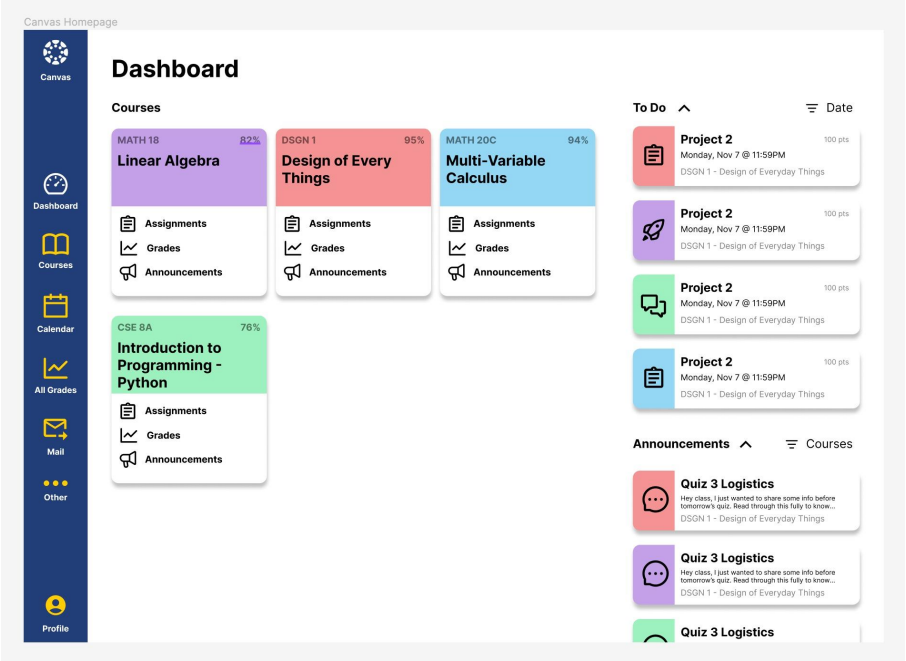


Figure 8: Redesigned Homepage UI

To create our redesign of Canvas's homepage interface, we used Figma to reimagine the **affordances** and **signifiers** that exist on the page. Our Figma mockups are visible here and the live prototype can be seen here.

Part C: Justify Redesign

In our redesign, we focused on a primary goal of reducing **knowledge-based mistakes**, mitigating the largest recurring problem from our interviews. We did this by minimizing the **affordances** on the Canvas homepage dashboard and clearly **signifying** each of them, with better organizational structure and grouping by feature. From the data in our interviews, the core features displayed are only the ones commonly used by all users, such as accessing course pages and info, viewing actionable to-do items, and seeing all announcements. The remainder of the information is grouped by the side menu in an easily accessible and readable way that includes titles.

With our new design, some of the critical differences include:

- An easily accessible view of to-do items only in a collapsible section on the home page
    - 100% of our participants stated that checking assignments is a primary function of Canvas for them with a mean time of 16 seconds to locate all of this information.
- An easily accessible view of recent announcements in a collapsible section on the home page
- An easily accessible view of all current courses with relevant subsections linked as the main element of the interface.
- Quick view of full grade menu through the sidebar that previously didn't exist
- Less relevant features stored in the "More" tab to reduce clutter
- Renaming "Inbox" to be "Mail" for more clarity

- Easily see all todos because it is separated from announcements
    - 11/11 participants stated that one of their primary usages of Canvas is to check assignments, yet the mean time to check these was 15.725 seconds. Although a To-Do list is available on the side of the dashboard and should only take a single glance to view upcoming assignments, it is cluttered with announcements and defeats the purpose of having a To-Do list. The term "To-do" often **signifies** action items to be done. However, this cluttered design leads the user's **mental model** of a To-Do list to mismatch the actual design. Because of this, we created a more streamlined design of checking for assignments by separating the To-Do list and announcements into their own toggle lists so that the users' mental model . These lists are also able to be filtered, upcoming assignments by date and announcements by course.

- Easily see all grades
    - 8/11 participants stated that they use Canvas to check their grades, yet 7 out of 8 of these participants were unaware of the grade menu feature that allows you to check all your grades at once. To mitigate this **knowledge-based mistake**, we added labels to the icons so that they would be more meaningful **signifiers** to the users. We also added a separate tab on the global navigation bar since it is one of the more commonly used features and would make it more perceivable as a feature. In addition, we added a feature to check individual course grades from the dashboard under each course tile.
- You can access less frequently used features in the more tab
    - We **constrained** the number of features on the dashboard and placed the less commonly used features (features users didn't say they used primarily) into the "Other" tab. This will help reduce **capture slips** in clicking through irrelevant pages.
- You can easily access assignments, grades, and announcements for each course
    - We placed the features that most participants cited they used Canvas for on the dashboard under each course tile in order to mitigate the capture slips we mentioned in the previous bullet point. This allows the primary features to be easily **discoverable**.

Part D: Redesign Tradeoffs

From Section II Part C, we described the tradeoffs in the initial UI for Canvas being high discoverability at the cost of low usability and comprehension. Our redesign is not free of trade-offs however we took these into account during our design process. We aimed to lower the **discoverability** slightly by keeping less relevant features in the application but out of the main interface for visibility purposes and dramatically improve comprehension with the more approachable UI. We believe that by placing additional **constraints** on the features, the application becomes significantly more intuitive to use. While many additional features may not be visible initially, the clarity of possible **affordances** improves greatly and all extra features are still accessible with minimal navigation due to better grouping of sections in the sidebar.