REDESIGNING CATME'S WEB INTERFACE
TO IMPROVE USER EXPERIENCE

by

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ABSTRACT

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Title: Improving Redesigning CATME's Web Interface to Improve User Experience
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CATME (Comprehensive Assessment of Team Member Effectiveness) is a web-based platform that is intended to improve team experiences for students and faculty in higher education. The goal of this study is to redesign the user interface for CATME employing User-centered Design (UCD) framework. The design process consists of four phases: discover, define, develop, and validate. This study examines the current website to discover potential usability problems by conducting different methodology. Then it moves into robust user research to define the user's pain points need to be addressed to improve user experience. In order to tackle the usability issues, design solutions are created and evaluated with real users. The result of the study is redesigned UI (user interface) for CATME's three key pages, the homepage, activity wizard, and data dashboard.

CHAPTER 1 INTRODUCTION

CATME (Comprehensive Assessment of Team Member Effectiveness) is a web-based platform that is intended to improve team experiences for students and faculty in higher education. It has been around for more than ten years and used by approximately 1,000,000 users in 85 different countries. This study aims to improve the CATME user experience. CATME supports two kinds of users: students and their instructors. The system helps teachers effectively manage teams in the class. In CATME, students can learn how to function effectively in their teams and improve collaboration skills. There are two CATME tools to support 'smarter teamwork' throughout the whole team experience.

1. The 'team-maker' tool allows instructors to group teams with the best compatibility. In the team-maker function, instructors create a team-maker survey with questions that assist students in forming teams with the best match. Instructors can select some generic questions that CATME provides in the system such as year, major, schedule, age, gender, and GPA or they can create their questions as well. Once the survey is completed by students, CATME collects the data, and instructors can decide the influence of each criterion to group teams. They can adjust the weight of each item and exclude some criteria as well. (Figure 1)
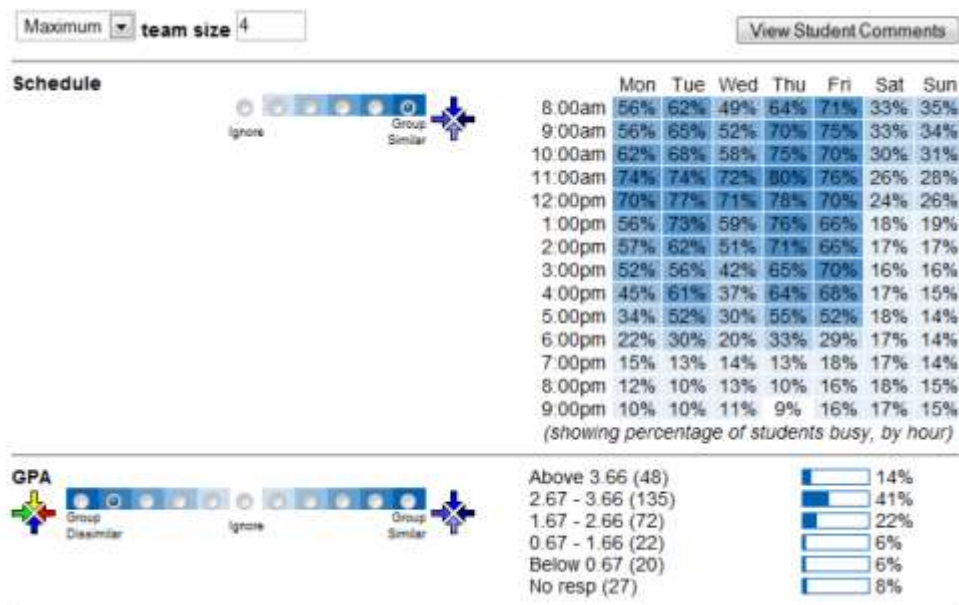
Figure 1. CATME. (n.d). pp-photo-img wp-image-1726 size-full lazyloaded (Image). *CATME*. Retried from https://info.catme.org/catme-tools/team-maker/

2. The peer evaluation function enables faculty to manage team dynamics effectively and also allows students to understand how they are perceived by team-members by reading comments and ratings from team members that are released by faculty. When a faculty distributes a peer-evaluation survey through the system, students evaluate their team members and themselves by using CATME's five evaluation instrument. (Figure2,3) If any exceptional conditions occur in a team (figure 4), CATME alerts faculties so that they can inspect the situation and intervene promptly. CATME also provides other tools such as accurate rating practice and useful resources such as a meeting agenda and a team charter form to support teamwork.

Figure 2. CATME. (n.d). size-full wp-image-1683 alignright lazyloaded (Graphic). *CATME*. Retried from https://info.catme.org/about/overview/

Figure 3. CATME. (n.d). The first of five rating categories: Contributing to the Team's Work.(chart). *CATME*. Retried from https://info.catme.org/catme-tools/peer-evaluation/

- **Low**—a student who rates him/herself as ineffective and who also receives "ineffective" ratings by teammates.
- **Overconfident**—a student rated as "ineffective" by teammates but rates him/herself as much more effective.
- **High**—a student who is rated as highly effective according to both teammate and self ratings.
- **Underconfident**—a student rated as highly effective by teammates but who under-rates her/himself.
- **Manipulator**—a student who rates him/herself as highly effective and who rates teammates as ineffective in disagreement with teammates. Such a student may be trying to influence the distribution of grades unfairly.
- **Conflict**—a team in which there is considerable disagreement among the various raters about the effectiveness of an individual student.
- **Clique**—a team in which cliques appear to have formed. The ratings show that subsets of the team rate members of their subset high and members of other subsets low.

Figure 4. Exceptional Conditions. Adapted from *CATME*, by CATME, (n.d), Retried from
https://info.catme.org/catme-tools/peer-evaluation/

CATME provides users with functions to support their team experiences throughout the whole process from forming to evaluating teams. Those functions undoubtfully benefit faculties and students. However, when it comes to usability of the website, CATME is not leading in the competition as the interface remains in the earlier back-end architecture created ten years ago and has not been upgraded much during the recent decade. Also, given the fact that CATME is originally designed to collect data not used by regular users, it has been experiencing usability problems which deter its growth. All the reasons above led us to decide to redesign CATME's interface. As a UX practitioner, my goal is to understand user needs and requirements and translate them into the system with a new look.

1.1   Project Scope

In CATME, there are two main platforms for users to interact with the system. First, there is CATME's info site (info.catme.org) where users obtain general information about CATME and F&Q. Secondly, there is a production site (catme.org) in which users can interact with CATME's main features such as team-maker and team evaluation function. Additionally, there is a CATME's YouTube channel that offers instructional videos. Given the time constraints of this study, my thesis focuses on improving usability in the production site. However, I consider

incorporating some elements from the other two channels into the production site as an opportunity to craft better user experience in CATME.

1.2   Target users

There are two types of CATME users, instructors, and students. Although CATME is available and benefits both of them, its most frequent users are instructors. Students' use is relatively limited and passive given the fact that they could only use the system when they are assigned in either team-maker or evaluation survey by an instructor. For that reason, this study aims to improve the interface in the instructors' view. To narrow down to a more manageable goal in the given time, I also divided the instructor users into two groups, existing users and new users. As CATME has been around for a long time, it has many regular users who don't encounter critical problems to navigate the interface. I believe that making the system intuitive for new users should also be usable and helpful for existing users. Thus, I shed more light-on new users' experience and improve the user interface of CATME in a way that is easy to use for people without any primary knowledge or guidance. However, I keep existing users in mind when designing a new interface by minimizing radical changes in the interface redesign phase.

CHAPTER 2   LITERATURE REVIEWS

In this chapter, I discuss published research on the topic of the study. First, I review studies on teamwork in education to uncover context and rationale for the study. I also analyze theological frameworks to gain knowledge of the existing concepts that can be incorporated into this study. Lastly, I synthesize some relevant works and evaluate the result to increase knowledge and familiarity with similar projects. This section helps me gain a solid understanding of the topic, define the proper frameworks, and understand common practices and opportunities.

2.1   Significance of Teamwork Education

Teamwork is an essential part of human life. There is a saying 'No man is an island.' The professional world is not an exception. As products and services of organizations have become more and more complicated, employers nowadays require employees to perform well in cross-functional and inter-disciplinary teams (Guzzo, 1992; Zedeck &Gold stein, 2000). As working efficiently in teams has been recognized as a significant factor of employees' superior performance (Dunne and Rawlins, 2000), many employers rate inter-personal, team skills "very-to-extremely important" (Lou, 2014) when they hire people. Therefore, there is an increased demand in education to improve students' interpersonal and team skills in response to the interest of the industry. Many university courses already include team-based projects to broaden students' interpersonal skills in preparation for the real world. Although students often work together in their school projects and it does benefit them in terms of developing team skills, Lau, P., (2014) claims that just working together with others doesn't guarantee cultivating students with interpersonal skills due to dysfunction and conflicts occurring in teams. A team could

confront variable issues emerging from different factors such as workload imbalance, capability deficiency, personality, miscommunication, and design decisions (Paretti, 2013).

2.1.1 Team Assignment

To prevent and control those problems, instructors can group balanced and compatible teams in the first place. A study carried out in 2010 (Layton, Richard A, 2010) shows that the assigning of a team is a significant factor of team success. However, it is impossible for instructors to consider all influencing factors and assign the best teams. As alternatives, faculty takes other ways of grouping such as self-select teams, assigning groups randomly, and forming teams with minimal criteria. However, a significant amount of studies demonstrates that those alternatives hurt teams' performance. For example, although self-select teams can increase team cohesiveness (Neal, D. 1997), it is likely to risk 'excessive homogeneity' and lack of diversity. Also, it can be uncomfortable and make students who are introverted or are new to class unmotivated. Disadvantages of random assignments are that the result is too arbitrary and it can negatively impact students' team experiences (Bacon, D., Stewart, K., & Silver, W.1999). Assigning method with a few criteria has a downside as well; it is not time-efficient and difficult to do especially for classes with a large number of students. With that being said, CATME's team maker function enables faculty to assign team more efficiently and effectively and minimize team frictions by grouping students with compatibility.

2.1.2 Team Evaluations

I have discussed preventing team dysfunction and increasing team success by assigning teams with the best match. It raises a question about when issues occurred how to identify and solve issues as an instructor. Lau states that when conflicts arise in teams, it is vital for faculties

to intervene and guide them through the problem to address the issues within the group. (Lau, P., Kwong, T., King, C., & Wong, E. 2014). However, it is difficult for faculties to capture those problems in the first place because they are evaluating team dynamics and individual contribution outside of teams. (Brown, Rust & Gibbs, 1994).

One of the ways to accurately diagnose students' performance and develop their team skills is performing peer evaluation. Peer evaluation is a reliable and accurate way of evaluating a team member's contribution. The positive effects of team evaluation have been identified by a significant amount of studies. For example, a study (Brutus, S., & Donia, M. 2010) shows students who are evaluated by peers frequently have higher effectiveness in teams than students who don't. A study done in 2002 proves that peer evaluation increases team effectiveness and satisfaction. (Erez, A., Lepine, J., & Elms, H. 2002). By providing online peer evaluation, CATME helps students develop their team skills and also gives faculty an overview of the team's performance and individual contribution.

2.2   User-centered design process

To build a website with good usability, designers need a framework. I employed User-center Design as a primary framework throughout the whole process. According to Don Norman (Norman, D. A., & Draper, S. W. 1986), the UCD process comprises four main parts: identifying user needs, analyzing requirements, designing, and evaluating the solutions. User-centered design (UCD) is a contemporary discipline that builds services and products around user needs and requirements as opposed to system-centered design (SCD) which focuses on product specifications. (Stuart Blythe,2001). SCD tends to force users to change the way they act and use a product according to technological capabilities. As a result, more often it leads to building an unusable and undesirable product for end users, which causes the project to fail.

In contrary, in the UCD process, practitioners start by identifying user needs and make products usable and the best they can be to meet the user requirements. (Norman D.A., 1986) Therefore, many studies claim that a user-centered approach is a key factor in the success of a product. (Maguire,2001) Although UX design is often considered as an additional process only when a company has extra time and budget due to the youth of the theory (Ward, J.,2006), the impact of the user-centered approach in an interactive digital product has been widely recognized by many studies. For example, in a scientific software development project done from 2006 to 2009 in the University of Dundee's School of Computing, the team incorporated user-centered approach to uncover usability issues and promote their user interface (UI) of their project. The study found that the UCD approach allowed them to gain invaluable insights and significantly increased their uses to more than 40 and still growing. The author claims that we should incorporate UCD into software development.

Furthermore, the user-focused approach has been demonstrated by successful firms like Amazon and Google. The founder of Amazon, Jeff Bezos, mentioned that the awareness of the importance of user experience allows them to go a long way in the competition. Google also said that its focus on user experience is a critical factor in promoting products that attract customers and has become one of the most successful global companies. With the proven impact of UCD approach in software development, I adopt the user-centered design as a critical framework for this study.

2.3 An agile and iterative method

Along with UCD framework, I incorporate the agile, iterative design approach as well, as it is proved to be beneficial for user-centric product development. (Agile Alliance, 2001) In the traditional product development process, organizations used 'waterfall development methods'

which are heavily structured and static. The development process is divided into multiple chunks of long term, and linear development process and each section takes at least a month or year to pass down to the next step. Although it was revolutionary in the mid 20th century, such a segregated and long-term process doesn't fit in the rapidly changing internet era where companies are required to be faster and flexible. The process involves massive documentation which means it takes a long time to release a product. Also, since evaluating and validating the product with end users is often neglected and put at the far end of the process, it is hard and costly for organizations to make a change when there is any usability problem in their products. To resolve the critical issues that appeared in the old system development cycle, many tech companies started employing an agile and iterative process instead of the traditional and rigid development process. The agile approach attempts to break down the whole product development process into short incremental iterations. It involves frequent collaboration and changes in teams. Each iteration includes continuous testing and feedback from end-users and stakeholders to deliver usable products (Beyer, H.,2010) which reflects the user-centric design. The iterative method has been implemented in software development companies, and it has remarkably changed the way teams work and significantly affected the success of a product in this fast-paced workflow.

Although agile methods seem different from a user-centered approach in terms of scale, the two approaches are aligned with building system around user needs and requirements. For that reason, I incorporate the agile and iterative process in which they make the product stronger.

2.4 Redesigning websites incorporating User Experience design approach

In the last sections, I discussed theoretical definitions of user-centric approach and its impact on software development. In this chapter, I discuss the practical part, how a user-centric approach is applied to a similar software redesign process. There is a considerable amount of

literature on redeveloping web design using a user-centered design approach. Before diving into the redesigned web user interface for CATME, it is essential to look at what has been done to see what worked well and what did less in terms of employing UCD and iterative UX process to the similar projects. Typical UCD process consists of overarching four main phases, identifying user needs, analyzing requirements, designing, and evaluating the solutions. Although methodologies and techniques under each step could vary depends on projects, they all aimed to solve usability problems by redesigning user interface.

2.4.1   Website redesign case studies

A website redesign project was conducted by the Hunter College Library (Becker, Danielle A, 2013). The goal of the project was to update the interface with a new look, added function, and better navigation. Through the design process, they carried out multiple rounds of usability testing at various times to evaluate changes. As a result, the author states that frequent usability testing allows them to effectively update the user interface according to user behaviors. However, the study found that regardless of the level of usability of the site, users need some level of education to utilize it fully.

Another library website nine-month redesign project was performed in 2003-2004. It incorporated various UX methodologies to undertake the project. In the early stage of the study, they carried out a focus group and survey methods to gather information about user needs and requirements. Next, in the design phase, designers created prototypes with different levels of fidelity. Also, the team undertook a 'parallel design' technique in which several stakeholders, not just designers were asked to design some key pages. This method is an efficient way of exploring all possible alternatives in a short period as each member has different ideas that are original. Also, a card sorting activity was carried out to come up with the most effective and intuitive site

labels. With prototypes that were created based on the initial phases, two rounds of usability testing were conducted to validate ideas. The result of the evaluation shows that users reacted positively to the redesigned interface and use of main pages significantly increased. The study also outlines some lessons learned during the process. The author points out that the site could accommodate accessibility requirements. Also, it highlighted the importance of communication between stakeholders in the process advising how to keep the team in the loop. It stressed that every design decision needs to be backed up by user research and data. Another suggestion was on efficient usability testing such as leveraging local resources and scheduling of tests sessions efficiently.

I examined how the UCD approach can be applied in software redesign projects. Regardless of the difference in methodologies, the studies are in line with a variation of UX approaches with some alterations. I discovered that user-driven and iterative redesign approach not only increases usability but also builds confidence and assurance for the teams that the system would be stress-free, functional, and above all else, user-friendly.

CHAPTER 3   METHODOLOGY

This chapter discusses the design process and methods undertaken to complete the CATME redesign project. I employed a User-centered design (UCD) approach as the main framework. The overall design process for this study consists of four phases: discover, define, design, and validate. The discover stage aims to understand the existing CATME's system and reveal underlying user needs, requirements by adopting competitive analysis, site map, and heuristic evaluation method. In the define phase, I carried out user research to uncover user motivation, goals, and needs by conducting user interviews and creating a user journey, empathy map. This phase also seeks to define key problems to solve in the study. Thus, I organized and narrowed down all the insights to key problems to tackle using affinity diagramming technique. A third phase of the process focuses on coming up with design ideas and solutions to address the user problems identified in the define phase. In this stage, I visualized information architecture, wireframes, and prototypes. In the last validate process, I brought end-users on board and assessed the design ideas by having the users interact with an interactive prototype. Following the agile and iterative process, two rounds of usability testing were conducted. Throughout the process, I constantly revisited previous methods as I learned more about user needs.

3.1 Discover

The goal of the discover phase is to collect data through various sources and methods before talking to actual users. It enables me to understand CATME's existing system, how it assists user needs and to inspect any underlying factors that possibly affect usability. The techniques used in this phase are competitive analysis, heuristic evaluation, participation observation, and site map.

3.1.1 Competitive Analysis

In the early design stage, I conducted a competitive analysis as a means to understand how competitors are accommodating similar user needs. Benchmarking CATME's system against competitors, allows me to discover different ways to satisfy user needs and what the best practices are. Initially, I compared eight websites with relevant features. Then I narrowed it down to 3 competitors have a direct correlation with CATME. I will discuss this in greater detail in the next chapter.

3.1.2 Heuristic Evaluation

I applied the heuristic evaluation method to identify usability problems. Seven experts assessed CATME's UI (user interface) based on nine usability principles formulated from the '247 usability guidelines' created by Dr. David Travis (2016). The experts were given 127 questions about the CATME's existing interface and give a score for each item in the scale of -1 to 1 as well as comments. Listing common problems that most experts experienced in order of frequency and severity, I was able to prioritize usability problems that need to be addressed. Although it needs further examination with usability testing with real users, reviewing the interface with experts is insightful and beneficial to spot potential usability problems.

3.1.3 Participant Observation

In an attempt to gain an in-depth understanding and first-hand knowledge on the system, I implemented a participant observation method in which I become involved in CATME as a user. I incorporated it into my TA (Teaching Assistant) classes and used CATME's two main features: team evaluation, and peer ealuation survey. I created the survey study for assigning teams, peer evaluation and sent out to 34 students. By becoming a user, I was able to understand

the system in greater detail than by merely observing or trying with test samples and obtain

valuable insight into end users' experiences and their needs.

3.1.4 Site Map

I created a diagram to visualize how each page fits in the system and how they are linked.

It also helps me to understand how users would navigate through the website to achieve their

goals and assess the efficiency and effectiveness of the current system against user needs.

3.2 Define

It is time to be empathetic toward end-users and understand their interaction with

CATME. In this phase, I talked directly to CATME users to find out what they are expecting

from the service and what's working or what is not for them. Based on the findings from the user

interviews, I created a user persona, empathy map, and user journey map to achieve a deeper

insight into user experiences. It uncovers what CATME can improve upon to enhance user

satisfaction. Then, to define critical problems to solve in this study from a large amount of data, I

used an affinity diagram methodology.

3.2.1 User Interviews

To unpack how users interact with CATME, I conducted structured interviews with five

interviewees. To reveal insights from diverse users, I recruited people with different depth of

experience in CATME. Among the five users, two of them are relatively new to the system and

only use a single function out of the CATME tools. Whereas the other three users are those who

have been using CATME for more than five years and utilize all the tools. This method allows

me to establish user expectations, goals, motivations and needs and inspect how the level of experience in CATME affects user satisfaction.

3.2.2 User Empathy Map

User Empathy Map aims to broaden knowledge of user behaviors and attitudes.(Ferreira, B., Conte, T., & Diniz Junqueira Barbosa, S.2015) The format of empathy maps contains four aspects of user behaviors: what a user says, thinks, does, and feels. Since all design decisions need to be user-driven, it is imperative to articulate what's in the user's mind. For that reason, I created a user empathy map, and it helped me understand the target users thoroughly.

3.2.3 User Persona

A user persona is a profile of a hypothetical target user based on the overlaps and patterns identified from user interviews. It is a frequently-used UX tool invented by Alan Cooper to demonstrate user needs and expectations in contexts. Studying contexts of target users and mapping their lifestyles and behaviors is essential to accommodate their needs to design improvement.

3.2.4 User Journey Map

The objective of creating a user journey map is to illustrate a target user's behaviors, feelings and some frictions they may be facing throughout different touch points in the interaction with CATME. I divided the whole journey of instructors in managing team activities into three stages: formation, execution, and completion. By mapping out the actions that users need to take to accomplish their goals in each stage and how they feel when they are going

through each milestone of interaction with CATME in a diagram, designers can easily discover

users' pain points that need to be tackled to improve usability.

3.2.5 Affinity Diagram

Affinity diagram organizes and consolidates complex ideas into a few related groups

according to their affinity. This technique was used to sort through a broad range of insights and

findings from the research phase. Using this method, I was able to narrow them down to four key

problems to solve in this study.

3.3 Design

Based on the established user expectations from the last two phases, in this phase

designers move to create design solutions to meet the user needs. I generated hand-drawn

sketches, a user workflow, wireframe, prototypes to flash out design ideas and solutions. It is an

iterative and recursive process as designers need to continually validate design and update

accordingly. Then, some detail documentation about the design was carried out to define the

style and usage of the visual components included in the redesigned interface.

3.3.1 Hand-drawn sketches

Drawing rough sketches of ideas and solutions is the easiest and quickest way for

designers to get their ideas across to stakeholders in the organization. It allowed me to get

feedback, quickly iterate, and modify the design to achieve better solutions.

3.3.2   User Task flow

User flow is a diagram that describes users' possible paths to achieve their goal within the system. As Nielsen claims that a website should allow users to achieve their goals seamlessly, user task flow is created to build a system that matches user behavior. I deconstructed the existing flow and reconstructed it in a way that eases the use of the website.

3.3.3   Wireframes

Wireframes are the backbone of a user interface that displays arrangement, allocation, and a hierarchy of items in each screen. It also visualizes how each page is linked together. The method is used to communicate functionality and basis of design with a team or different stakeholders in the organization without the difficulty of building digital prototypes. The format of wireframes can be as rough as hand-drawn sketches to as complex as fully furnished prototypes.

3.3.4   Prototype

A prototype is a preliminary version of the final design. Designers can create a prototype with different levels of fidelity. It typically includes general contents, labels, and color scheme. It helps designers make final decisions about design details and allows them to make quick adjustments for robust solutions.

3.4   Validation

In the design phase, designers carefully plan and propose what their design solution looks like, why it will be usable and useful, and how users will interact with it. In a validation phase, designers test their assumptions with intended users to see if it does work and fit user needs and

wants. Nielson cited that frequent and interactive user testing is essential to design usable products. The best advantage of the validation section is that designers can test it with real users to see how they interact and make some quick changes without development costs.

3.4.1   UI guidelines

A digital product should provide users with a coherent and consistent experience. Creating a UI guideline is a crucial part when designers pass down their design to developers to implement and transfer to computer language. To prevent any confusion in the transition and ease of the application process, I created sets of recommendations defining items used in their design -- from buttons to layout of the user interface.

3.4.2   Usability Testing

Usability testing is a valuable research resource to reveal potential usability problems of their products by having users interact with their prototypes. Such testing is crucial because it is impossible for designers to create a perfect design intuitively in a first attempt. It is recognized that iterative usability testing provides valuable insights into the improvement of an organization's website (Gallant, 2014). Therefore, I adopted the concept of iteration by conducting two rounds of usability testings with a small refinement of the design. The testing yields valuable qualitative and quantitative data of the user's reaction to the redesigned interface.

In this chapter, I discussed the design process and methodologies I carried out to complete this study to improve the user experience of the CATME production website. I incorporated the UCD (User-centered design) design process as a broad framework. There are four main phases this study aims to perform : Discover, Define, Develop, and Validate. I will discuss the process and findings of each phase in greater detail in the next chapter.

CHAPTER 4   RESEARCH PROCESS

4.1   Understanding the Existing System

4.1.1 Competitive Analysis

In the early stage of the design process, I conducted a competitive analysis as a means to understand how competitors accommodate similar user needs. As an initial analysis, I examined eight websites that have similar characteristics. I inspected their strengths and weaknesses to understand how they offer their service and what works well and what does not. (Table 2) It gave me a general understanding of CATME's position in the market in terms of usability and functionality. Then, I picked three major websites to examine further. This time, I evaluated the competitors' user interface using seven usability principles extracted from Dr. David Travis's 247 usability guidelines (Travis, 2016). In order to make the outcomes measurable, I assigned two questions (Table 3) to each principle and rated them on a scale one to five. Afterward, I created graphs to show a result (Figure 5).

By benchmarking CATME's interface against competitors (figure5), I found some strengths and weaknesses and of the system in comparison to the competitors.

- **Strengths**

  o Trust & credibility: CATME has a higher score on the 'Trust & Credibility' category. The info site shows the names and photos of the system founders. There have been lots of universities and over one million college users.

  o Navigation flow: CATME is scored higher in terms of 'navigation flow' because of its simple and clean interface.

- o Data entry: the results show that CATME has a relatively clear visual clue that shows where to put data.

- **Weaknesses**

  - o Page layout: although CATME's interface is simple and clean, the layout is outdated and different from other conventional websites that users are familiar with.

  - o Task orientation: the way information is arranged within the interface isn't aligned with users' mental model and is not efficient.

  - o Homepage: product categories are not visible on the homepage, and value prepositions are not clearly stated.

  - o Writing & contents: the site doesn't provide clear and concise statements; there is too much text in pages.

Table 1. Initial Competitive Analysis

		Main Feature	Strength	Weakness
Keamk		Teammaker	Clean & straightforward user interface	Single function / limited criteria to form teams
Chirag Mehta		Teammaker	Easy interaction	Outdated Interface
Moodle		Peer Evaluation	- Amount of information - Final grading calculator	Information overload Navigation is not intuitive
Teammates		Peer Evaluation	- Easy navigation and introduction - View responses in different format and statistics	Users have to manually type teams Lack of back-up research to evaluate peers
Peergrade		Peer Evaluation	Data-driven insights about their course	Commenting
ITPMetrics		Peer Evaluation	Easy navigation	Main page being not intuitive
SPARKPLUS		Peer Evaluation	Various visual representations of the results	Registration being not staightforward
WebPA		Peer Evaluation	- Moderation feature -Non-completion Penalties	Buggy system

Table 2. Categories of Competitive Analysis Categories

Homepage	Q1: Product categories are visible on the homepage.
	Q2: The value prepositions are clearly stated on the homepage.
Organizational Clarity	Q1: Information is presented in a simple, natural, and logical order.
	Q2: The tasks sequence parallels the user's work process.
Efficient Navigation	Q1: There is a convenient and obvious way to move between related pages and sections, and it is easy to return to the homepage
	Q2: Terminology and conventions (such as link colors) are consistent with general web users
Forms & Data Entry	Q1: Questions on forms are grouped logically, and each group has a heading
	Q2: Fields on forms contain hints, examples or model answers to demonstrate the expected input
Trust & Credibility	Q1: It is clear that there is a real organization behind the site
	Q2: There are real people behind the organization, and they are honest and trustworthy
Writing & Content Quality	Q1: Pages use bulleted and numbered lists in preference to narrative text
	Q2: Pages are quick to scan, with ample headings and subheadings and short paragraphs
Page Layout & Visual Design	Q1: The site has a consistent, clearly recognizable look and feels that will engage users.
	Q2: The layout provides clear visual clues.
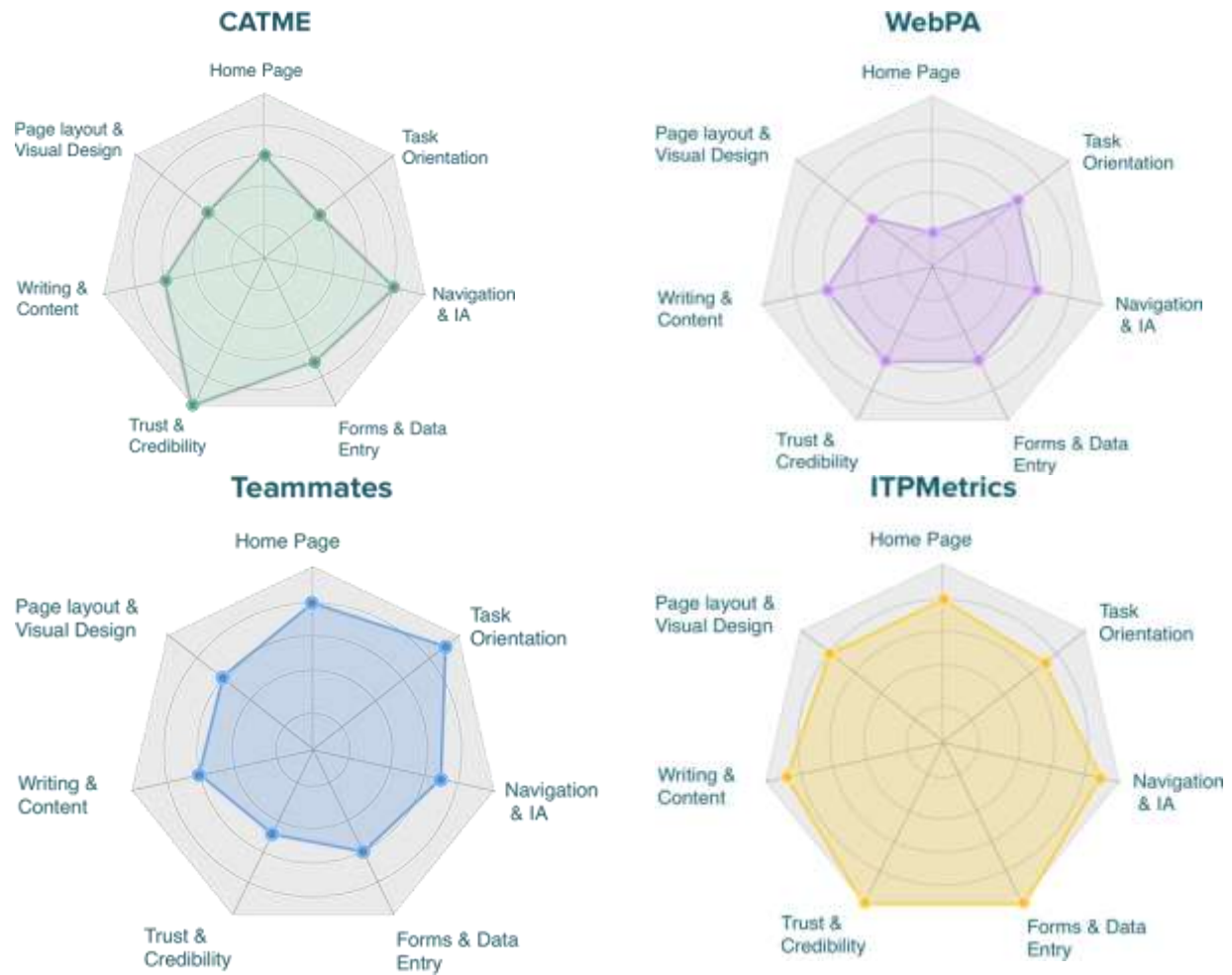
Figure 5. Competitive Analysis Result

4.1.2 Sitemap

Using a sitemap, I visualized how each page is connected in the system to examine the efficiency and effectiveness of the current system. It also allows me to understand how users would navigate through the website to achieve their goals.
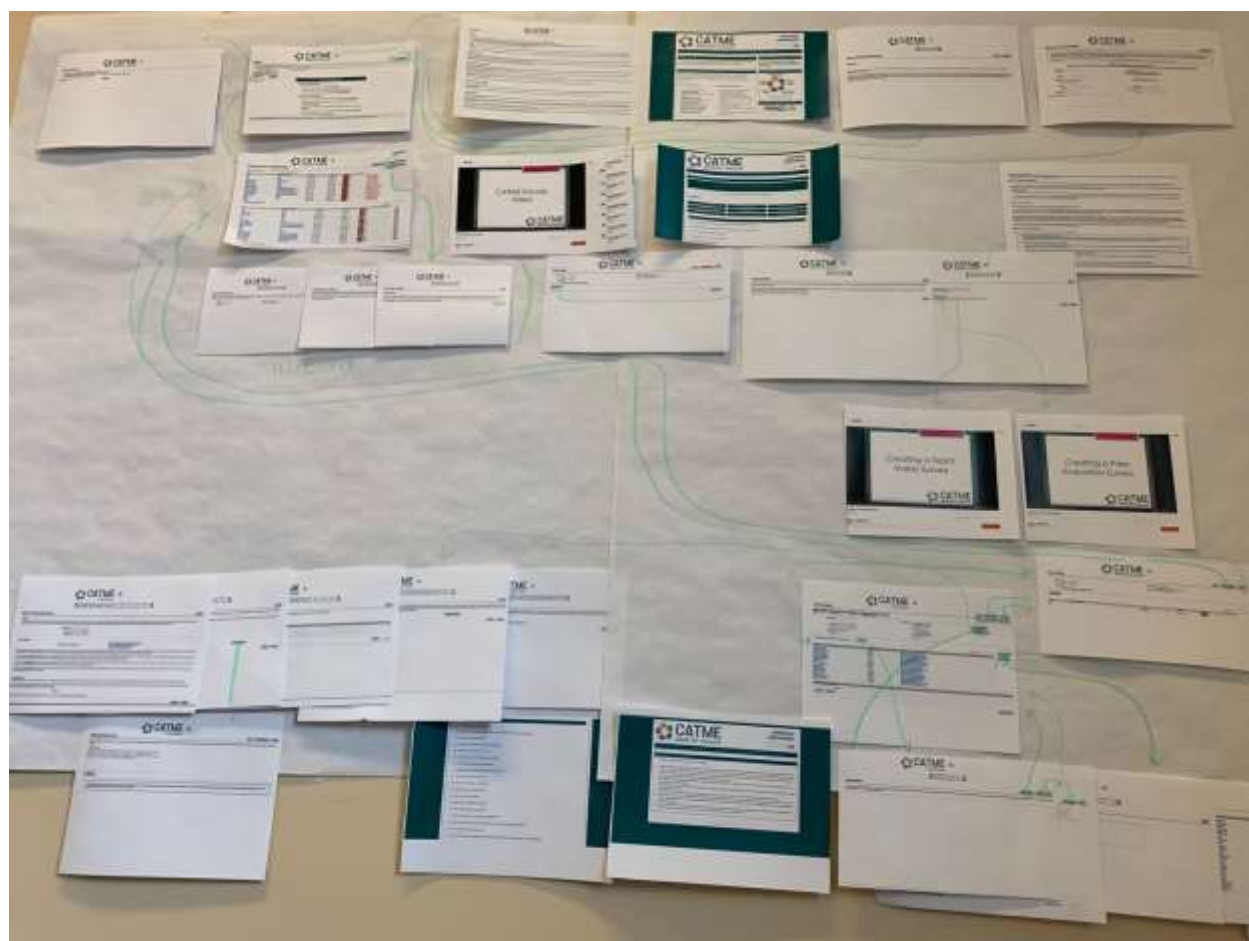
Figure 6. CATME's Production Site Sitemap
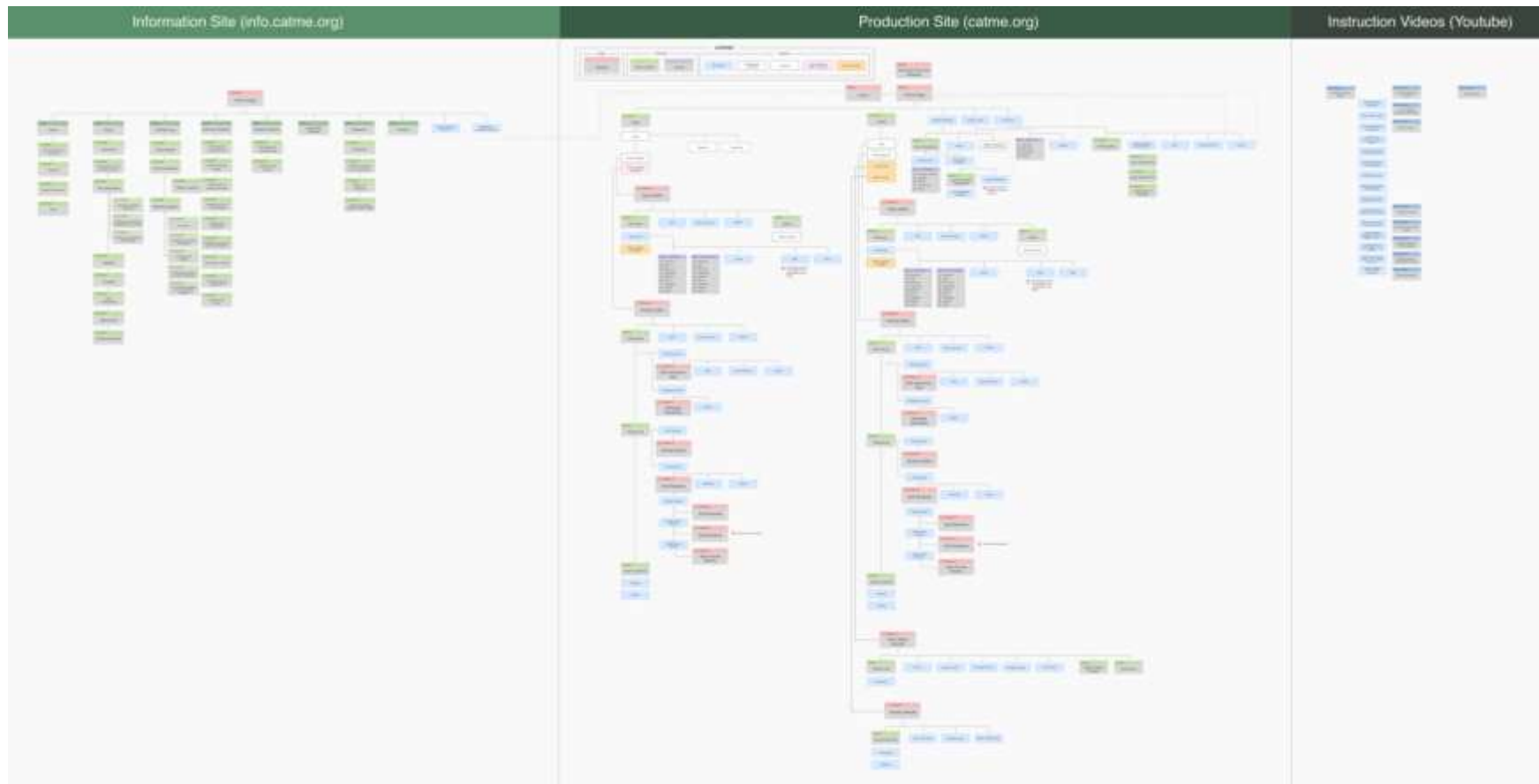
Figure 7. CATME's System Sitema

4.1.3 Heuristic Evaluation

I conducted a heuristic evaluation with a group of experts to examine CATME's interface. A heuristic evaluation used to critique a product's usability by involving a set of evaluators. The experts are not the 'real users' so the result might be different from the users' perspective. It allows designers to gain insights into potential usability problems and an idea of how to improve the desirability of the interface. For this usability inspection, seven experts assessed CATME's UI (user interface) based on eight usability principles: Page Layout & Visual Design, Navigation and IA, Content & Writing Quality, Help & Feedback & Error Tolerance, Task Orientation, Home Page, Forms & Data Entry, and Trust & Credibility. The principles were taken from the '247 usability guidelines' by Dr. David Travis (2016). Since the 247 guidelines are content-specific and some of them are not applicable in this study, I modified and narrowed down the questionnaires.

Consequently, the experts were given 127 questions and asked to give a score for each item on in a scale of -1 to 1 with comments. By making a list of common problems that many experts experienced in order of frequency and severity (Figure 6), I was able to prioritize usability problems that need to be addressed. Although it needs further examination with usability testing with real users, reviewing the interface with experts is insightful and beneficial to spot potential usability problems. The result shows that the majority of evaluators think that CATME could be better in terms of the 'Page layout & Visual design,' 'Navigation and IA,' 'Content & Writing Quality,' and 'Help & Feedback & Error Tolerance' categories.

Figure 8. Result of the Heuristic Evaluation

4.2 User Research

4.2.1 Semi-structured User Interviews

I conducted user interviews to collect first-hand information about instructors'

interactions with CATME. To reveal insights from diverse users, I recruited faculty with

different depths of experience in CATME. I divided users into two groups: a group who have

been using CATME more than five years and utilizing most of its tools, and the other group

which is relatively new to the system and has limited use of CATME's functions. Throughout

this section, I use 'heavy users' to refer to the former user group and 'light users' for the latter

group. For this interview, I recruited three heavy users and two light users to examine how the

level of experience in CATME affects user experience. (Figure 7)

Furthermore, I considered their confidence in using web-based platforms since it can

affect user experience. Overall, I recruited five instructors as interviewees considering two

factors: depth of experience in CATME and familiarity in using digital devices. (Figure 6) The

interviews were conducted with semi-structured questions. In the beginning, they were asked

about basic information and generic experience about using CATME such as a history with

CATME and issues they have faced. Next, I asked more specific questions about using peer

evaluation and team maker functions. I ended the interviews with suggestions and additional

comments from them. Each interview lasted for 30-40 minutes and was recorded with their

permission for accurate transcription. After the conversations, I organized the findings and coded

them for analysis.
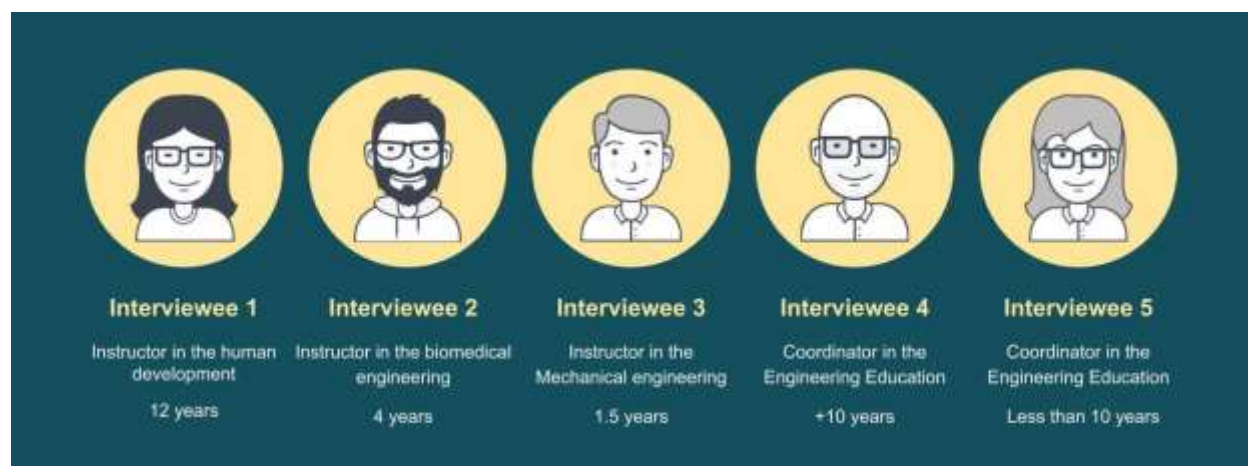
Figure 9. Interviewee Profile
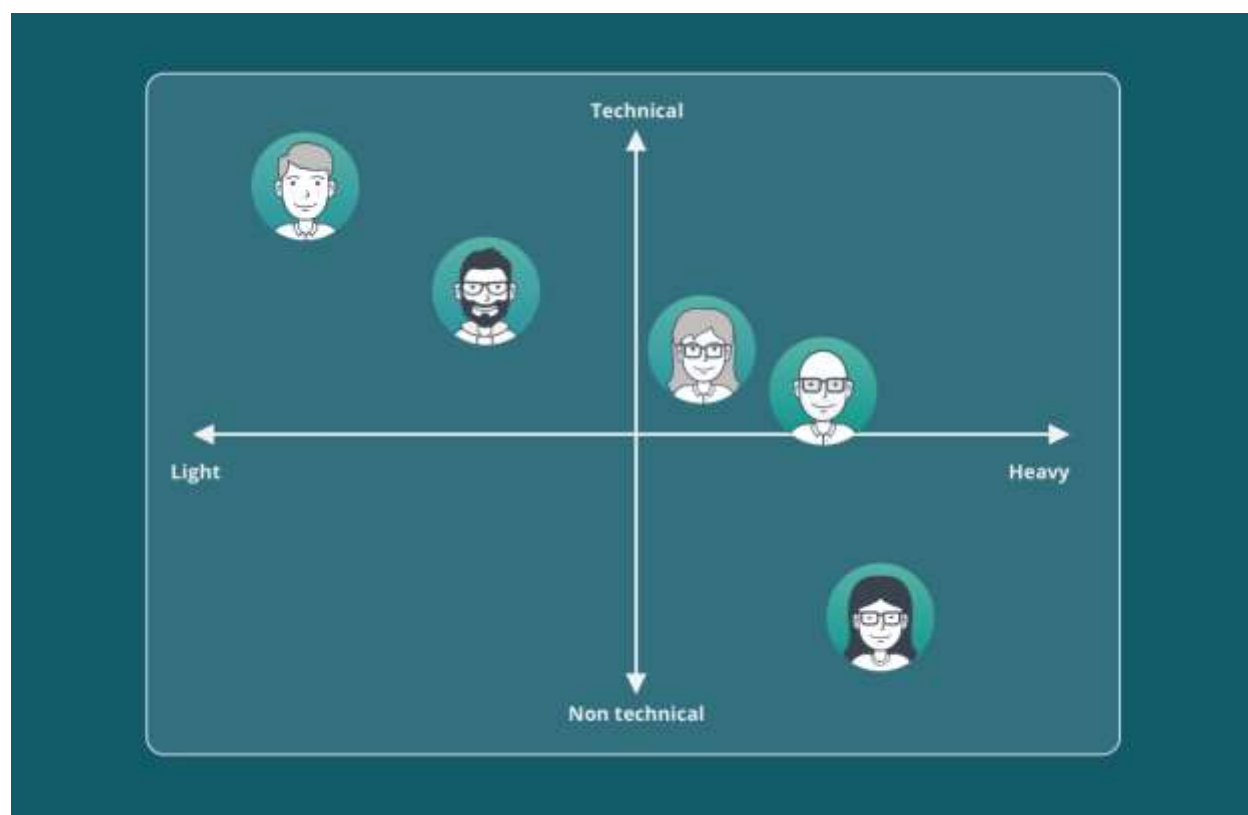
Figure 10. Interviewee Classification

Table 3. Interview Questions

Basic Information		• **Tell me a little bit about yourself.** • **What does your typical day look like?**
Intro Questions		• How did you find out CATME? • Tell me about the first time you used CATME. How did you familiarize yourself with it? • What functions of CATME do you normally use? How? • When did you last use CATME?
Experience & Opinion		• Do you think that students have improved their team skills over the course of the semester? ○ If so, what attributes were improved? • How do you introduce CATME to students?
Topic-specific Questions	Team-maker	• Is there any category that you think particularly helpful to form teams?
	Peer evaluation	• Are students' CATME scores reflective of their performance? • What values have the function had for your class? • Is the report effective for you? How do you use the report CATME provides? • What details of the report do you look at? Information? CATME provides indicators of problems in teams. • How do you cope with the problematic situation? • How is that reflected on their grades? • How do you deal with different ratings between students? • Do you look at raw data? Or a summary?

Product Opportunity Questions		• What's most appealing about CATME?
		• What other products or tools have you tried out?
		• What do you like about CATME?
		• Is there anything missing from CATME that you expected?
		• What might keep people from using CATME?
		• What's the hardest part about using CATME?
		    ○ What are you currently doing to make this [problem/task] easier?
		    ○ Any suggestions for improving CATME?

4.2.2 User Empathy Map

To broaden knowledge of user behaviors and attitudes, I created a user empathy map for instructors. It typically contains four aspects of user behaviors: what a user says, thinks, does, and feels. I carried out a guerilla interview with three professors at Purdue to collect general experiences of managing teams. I created a user empathy map, and it helped me deeply understand the intended target users.
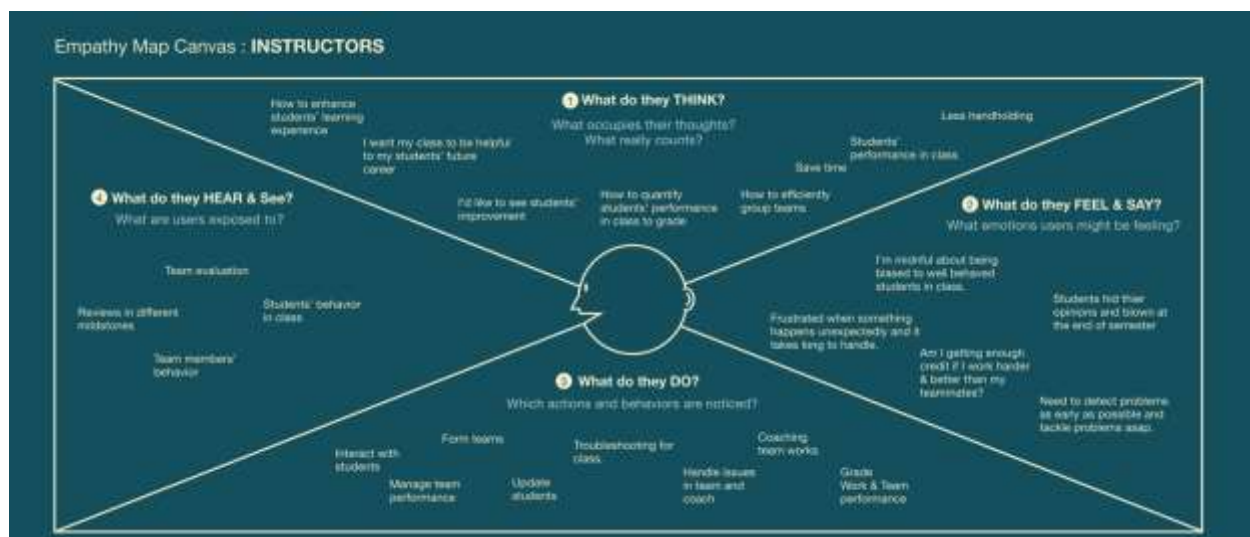
Figure 11. User Empathy Map

4.2.3 User Persona

Based on the patterns identified from the user interviews and empathy map, I created a hypothetical person that represents the target user group's characteristics. As Pruitt and Adlin stated in the study, using this technique is beneficial for the development process. It allows not only designers to think through user needs and goals but also different stakeholders to gauge the effectiveness of their product in a user's perspective.

"Patrick Bennett"(Figure10) represents the target user group – professors and new users to CATME who try to incorporate it in their classes to improve students' team skills. For context,

he is 37, a professor who lives with his wife and a daughter. He worked in a marketing team at one of the global companies for eleven years. Two years ago he shifted gears to a career in education because of his passion for teaching, so he became a professor in business school. His goal is teaching and preparing students for a successful career. He believes that knowing how to work with different people is important for students in their future career. Thus, he tries to include team activities in his classes but he is having hard time managing teams. He found that keeping track of team dynamics and experiences is difficult just by observing them in class. Also, even if he identifies team conflicts, he figures it is almost impossible to root out the problems properly and ensure team improvement due to too many students he is taking care of and his busy schedule. Recently, Patrick found CATME when he was browsing class materials. He tries to figure out how to use it without primary knowledge or having someone who walks him through it. Since he is teaching four classes this semester, he is busy answering emails, meeting students who have questions, grading, and preparing for classes. Hence, he wants something that doesn't take up too much of his time.

Studying contexts of a target user and mapping his lifestyles and behaviors is useful to accommodate target users' needs to design improvement.
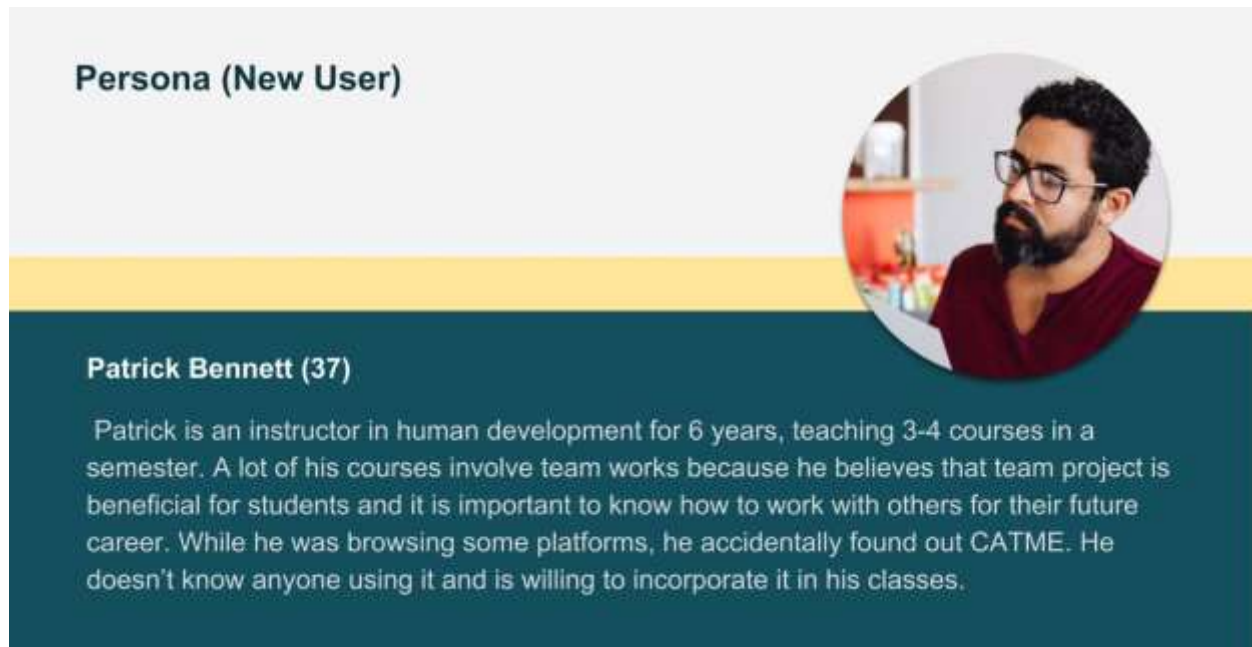
Figure 12. User Persona

4.2.4 User Journey Map

Using user experience map tool, I illustrated a target user's behaviors, feelings and some frictions they may be facing throughout the whole journey of using CATME in classes. I divided the journey into three stages: formation, execution, and completion. The information phase is when instructors are assigning teams. The execution phase is when they are managing teams, and lastly completion part is evaluating team performance. Then, I visualized different touch points between users and CATME within the phases and mapped out their actions and feeling changes. By thinking through their activities to accomplish their goals in each stage and how they feel when they are going through each milestone of interaction with CAMTE in a diagram, I was able to discover users' pain points that need to be tackled to improve usability. (Figure 12) The user problems are as follows.

1. **In Formation Phase**

   ▪ Users are overwhelmed by the number of tutorials and information in the help page to go through to get the hang of the system.

   ▪ Users are not sure how to use the system properly because of the not intuitive look of the system.

2. **In Execution Phase**

   ▪ Users are frustrated because they have to troubleshoot some technical problems for students after distributing a survey.

   ▪ Users are confused if they are on the right path and what their next steps are because of the lack of visual clues.

3. **In Completion Phase**

   ▪ Users are frustrated by the overwhelming amount of information in the evaluation data.

   ▪ Users are overwhelmed because when conflicts happen in a team, they need to sit down and talk to the team to diagnose and intervene.

   ▪ Users are not sure how to apply the data to their grading system.
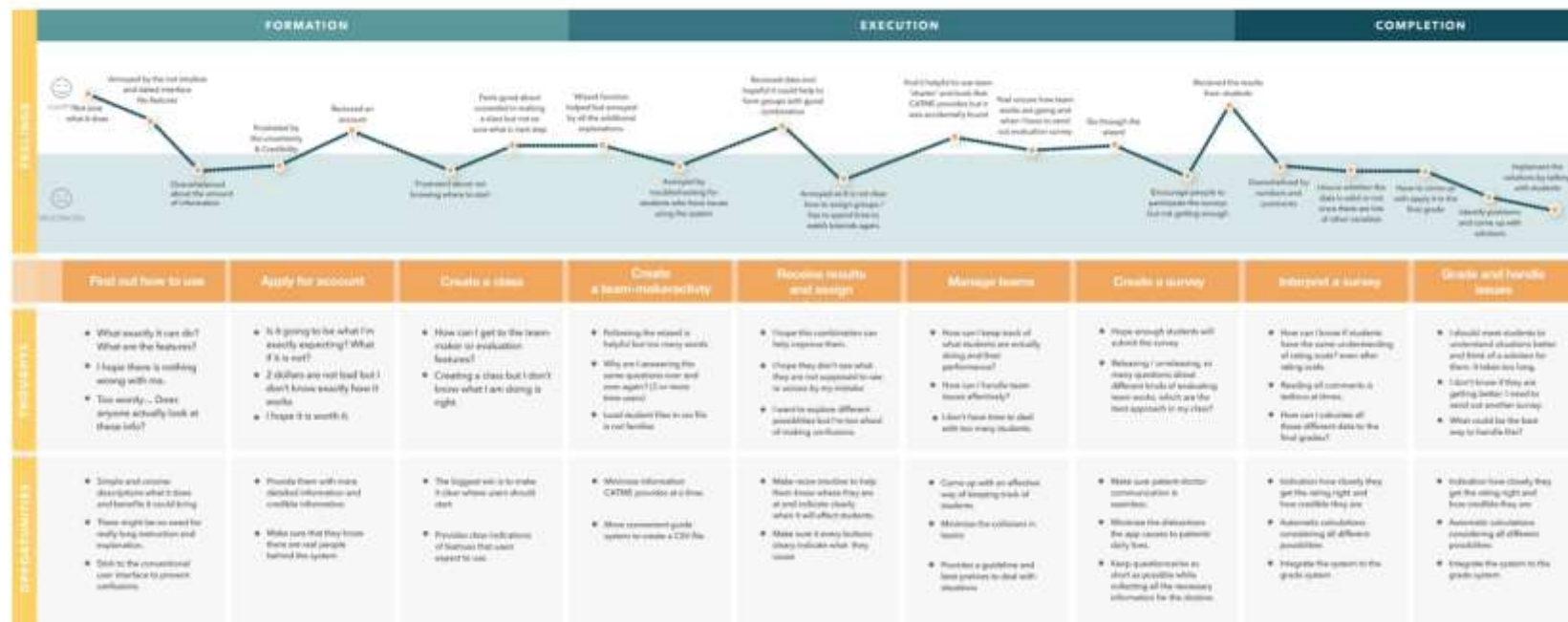
Figure 13. User Journey Map
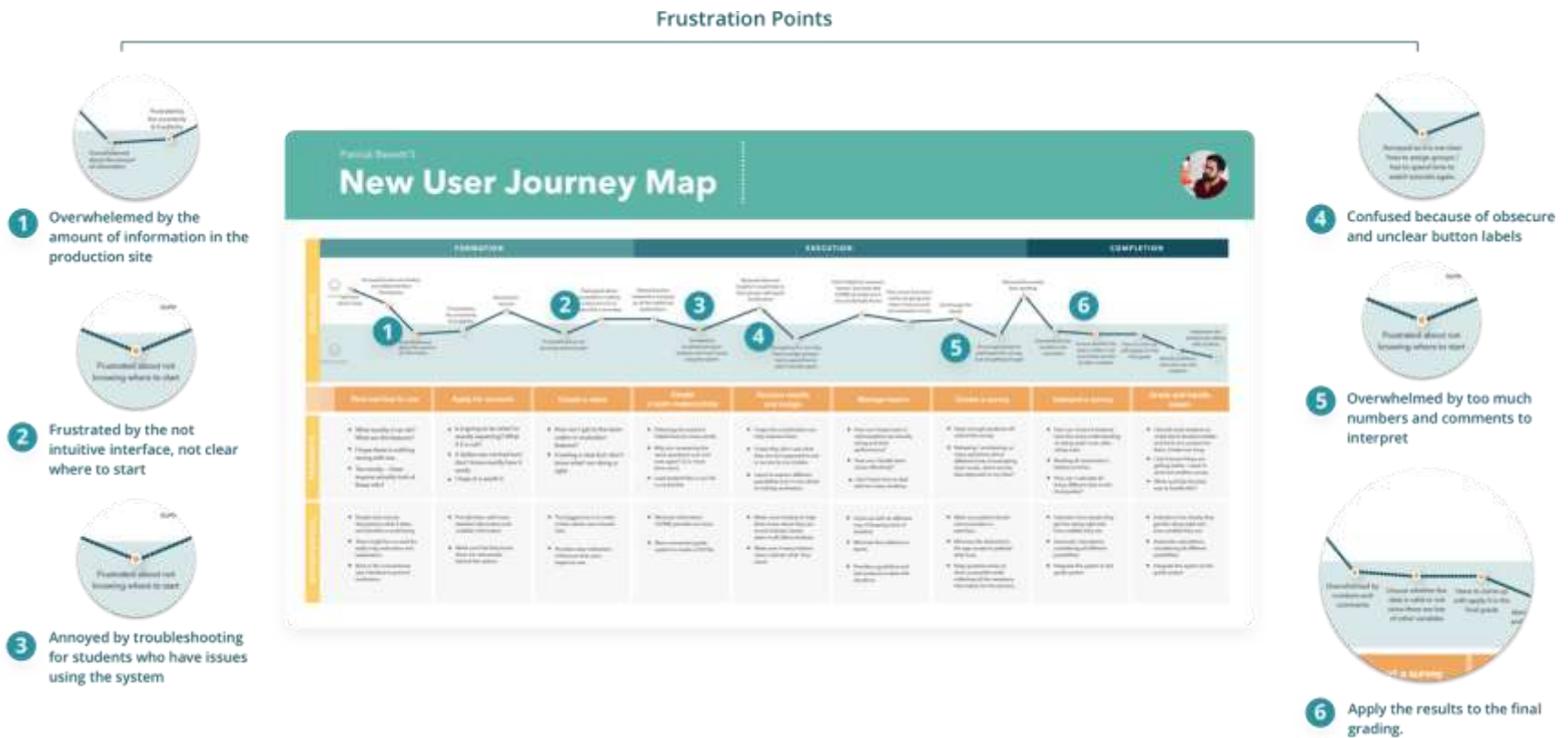
Figure 14. User Journey Map Analysis

<div align="center">

4.3   Problem Identification

</div>

4.3.1   Affinity Diagramming

I collected the broad range of findings from the research phase and narrowed down to key problems to solve using affinity diagrams. First, I wrote down the insights and problems frequently mentioned by users on post-its one by one. Then, I grouped them into a few categories according to their affinity. (Figure 13) After iterating the grouping activity, I was able to consolidate them to three main problems. (Figure14 &15)

<div align="center">

Figure 15. Affinity Diagramming

</div>
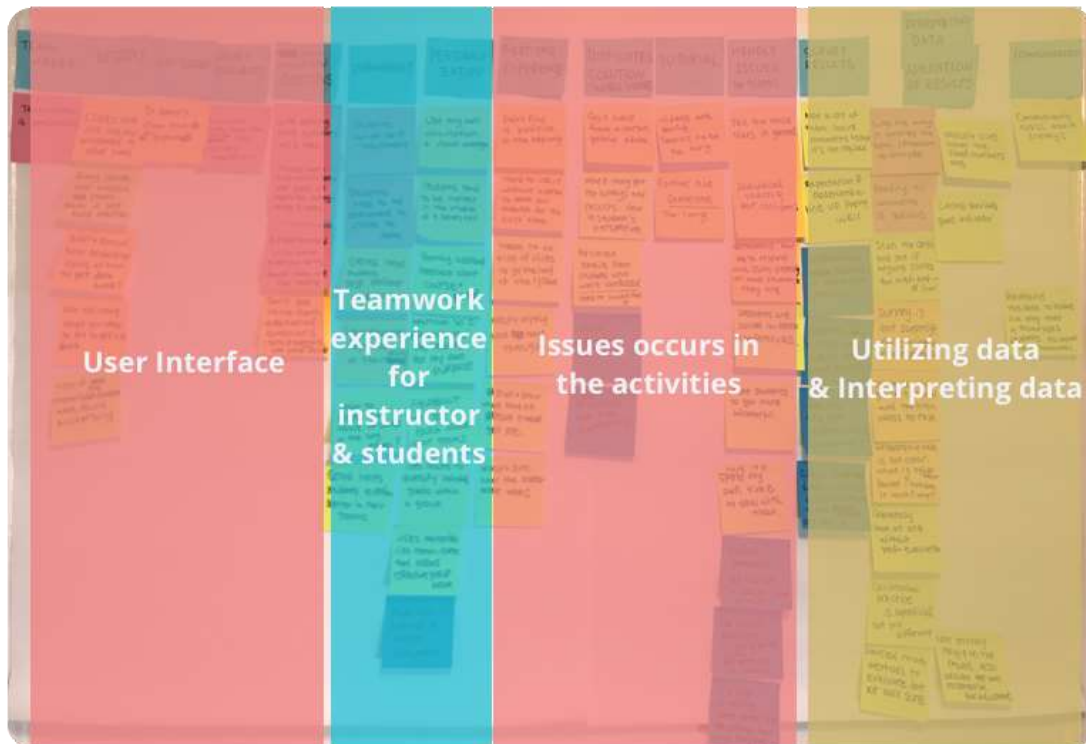
Figure 16. Affinity Diagramming Grouped

Interface & Navigation : New users have issues navigating CATME interface since it is dated and doesn't match with their mental model.

Interpreting data & application : In the raw data dashboard, users have trouble interpreting and sorting through the data because of information overload.

Students' Improvement & Handle issues in teams : It is hard for instructors to guide students when they have issues in teams and keep track of their improvement. Students don't know how to improve their team work skills according to the assessments from their teammates.

Figure 17. Problem Statements

4.3.2 Problem Statement & Direction

The key problems are as follows:

1. **The interface and navigation flow are not intuitive for first time users:** according to the user interviews, all of the interviewees, five out of five, answered that when they used the system at first, they had to ask a person who knows the system to walk them through due to the counter-intuitiveness of the interface. They mentioned that compared to other sites, items displayed in pages such as titles and buttons are not aligned with their expectation.

2. **Interpreting data & application is confusing and misleading**: the numerical evaluation data CATME provides is confusing on the first use. Users are not sure how some of the functions work (e.g., adjustment factor). Also, the way it presents the data can mislead people.

3. **Handling issues in teams and ensuring students' improvements**: CATME does a great job of delivering data from teams and alerting instructors of exceptional conditions. So what? Instructors still have to come up with ideas on how to resolve the issues and so do students. They get informed, but they don't necessarily know how to overcome the problematic conditions.

Because of time constraints, I decided to focus on solving the first and second problems in this study. The goals of this study are defined as follows.

1. **Enhancing first-time users' interaction with the CATME production site**: I aim to redesign CATME's interface design that allows users to interact with less assistance or training. Due to the time limit, I focused on redesigning three key pages: homepage, activity wizard, and evaluation data dashboard page as I thought they are the most frequently used by users.

2. **Helping users interpret and utilize data easily:** design a new way of presenting peer-evaluation data that users can easily understand

CHAPTER 5 DESIGN PROCESS

5.1 Interface Criticism

Before starting to create design solutions, I examined the existing website's key target pages: a homepage, activity wizard, and evaluation data dashboard page. I made a list of common problems of the three websites according to website design guidelines (Nielsen, J.2001).

1. **Homepage** (Figure 16): one of the prominent experts in UX realm, Jacob Nielsen asserts in his article: 'your homepage is often your first – and possibly your last – chance to attract and retain each customer, rather like the front page of a newspaper.' (Nielsen, J.2001). As he mentioned, a homepage is the most important page in digital products. Using Nielsen's design guideline (Nielsen, J.2001). , I found some key problems in the existing system's homepage.

    a. **No hierarchy in items**: the homepage displays two similar tables that show surveys that recently created. They are taking up the majority of the page. However, it is not clear what each table is for and what users can do about it because it doesn't have clear labels to differentiate. Also, all buttons including navigation buttons have the same color and size without any discernable difference.

    b. **Communicating primary functions**: Nielson (Nielsen, J.2001) mentioned that a homepage must show users what users can do in the site, and also they should be able to figure out what the website does at a glance. Therefore, it is imperative to highlight the purpose of the site and key functions in a way that is clear to users what primary features are on a homepage. However, the existing homepage

doesn't comply with the guideline given the fact that there is no direct buttons or menus to primary tasks in the homepage.

   c. **No grouping**: all items on the homepage should be grouped based on similarity because it allows users to find items effortlessly. (Nielsen, J.2001) However, the elements in the existing homepage seem to be randomly organized and not grouped based on their characteristics. For example, the items related to a user such as 'my profile' and 'log out' buttons are too far from each other.
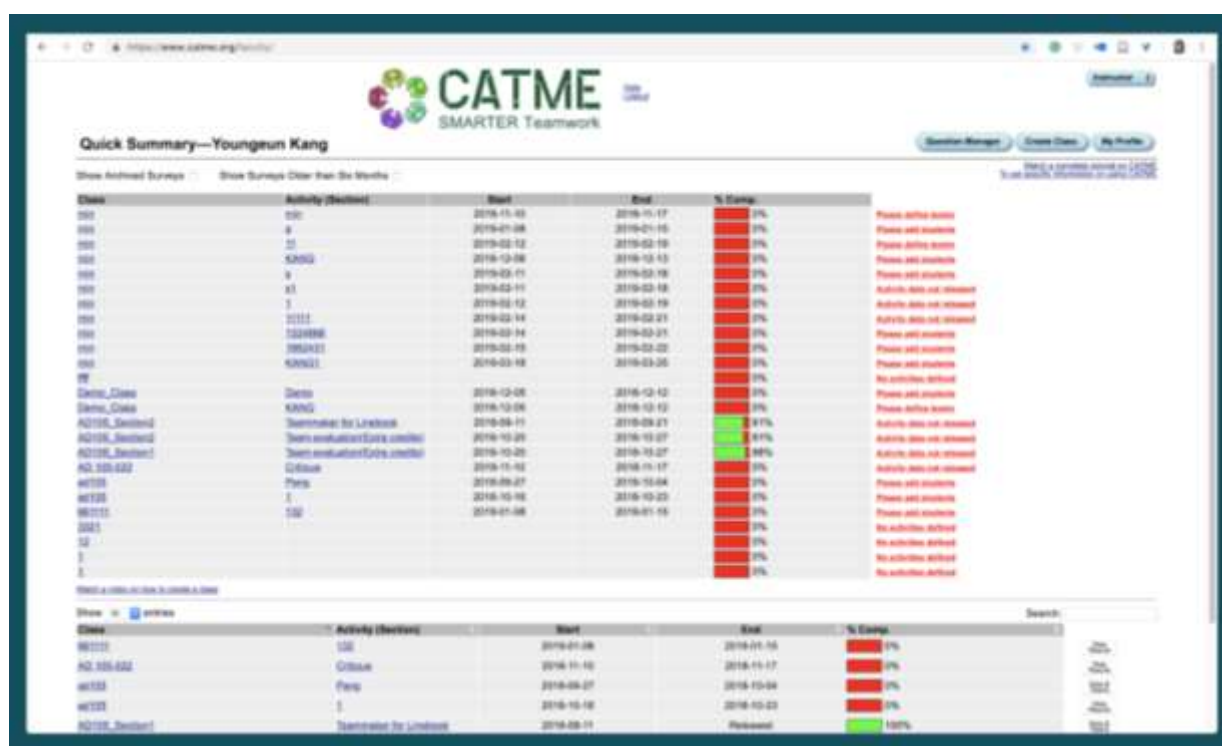
Figure 18. Homepage screen. Adapted from *CATME Homepage*, by CATME, (n.d), Retried from https://www.catme.org/faculty/

2. **Activity Wizard**: CATME provides step by step sequential 'wizard' pages to help users create a survey (Figure 17) . A wizard is multi-screen dialogue boxes to lead users to achieve their tasks. (Bollaert, J. 2001)

    a. **Too Many Steps**: the current wizard has too many screens for users to go through. Bollaert claimed that designers need to minimize screens because users get easily frustrated. (Bollaert, J. 2001) Also, users complained about no automation feature provided to ease the process.

    b. **Information Overload**: some steps have too many words to explain what to consider to proceed. It needs to be concise and clear.

    c. **No clear information about the next step**: the homepage provides a progress meter to indicate where they are in the wizard. However, it doesn't indicate what is the next task of the wizard process. Therefore new users often get confused about what to expect.

    d. **No exit warnings**: When users leave the wizard intentionally or accidentally, there is no notification to warn them and how to return to the task. Bollaert mentioned that the interface should inform the consequences of their action and confirmation

Figure 19. Activity wizard screens. Adapted from CATME Homepage, by CATME, (n.d),
Retried from https://www.catme.org/faculty/sw10_welcome?id=46699

1. **Evaluation Result Dashboard**: CATME provides faculty with an analytical dashboard page to display collections of numerical data and comments from students.

   a. **Lack of Visual Aids**: Neilson claims that using graphics strategically to visualize information can greatly intensify users' engagement on the website. (Nielsen, J.2001) CATME's current dashboard page doesn't utilize any visual attributes (e.g., color, graphic, and shape) to support them to interpret data easily.

   b. **Lack of Contexture Help:** One of the interviewees mentioned 'what data does is not clear. It's not intuitive what is the adjustment factor is, how it works, and why it is telling me, so I ignore all those things and use my own calculation.' The way it represents the data is confusing to new users and not clearly explained how users can interpret and utilize it. All information provided in a dashboard should be self-explanatory.
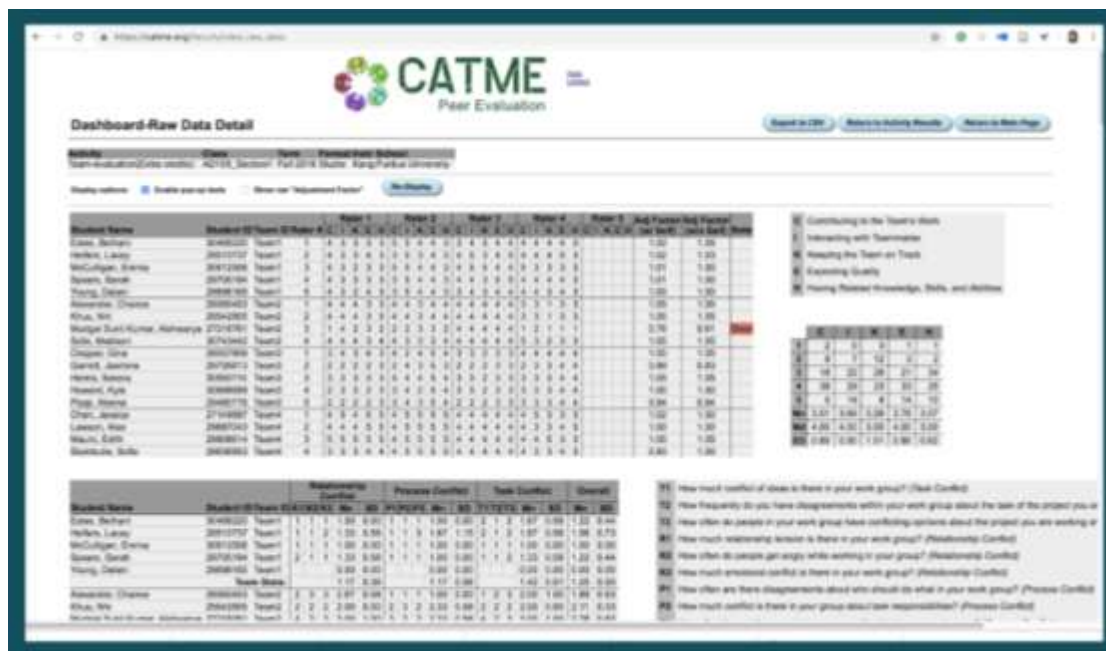
Figure 20. Evaluation result dashboard. Adapted from *CATME Homepage*, by CATME, (n.d), Retried from https://www.catme.org/faculty/view_results

5.2   Brainstorming and Wireframing

Focusing on the problem statement, I started brainstorming and visualizing ideas on paper. I quickly drew out different iteration of ideas and generated a simplified version of the interface. At the early stage of the project, this activity was beneficial because it allowed us to experiment with various ideas rapidly with minimal risk. With the sketches, I talked to the CATME team to gather feedback and decide promising options to develop further.
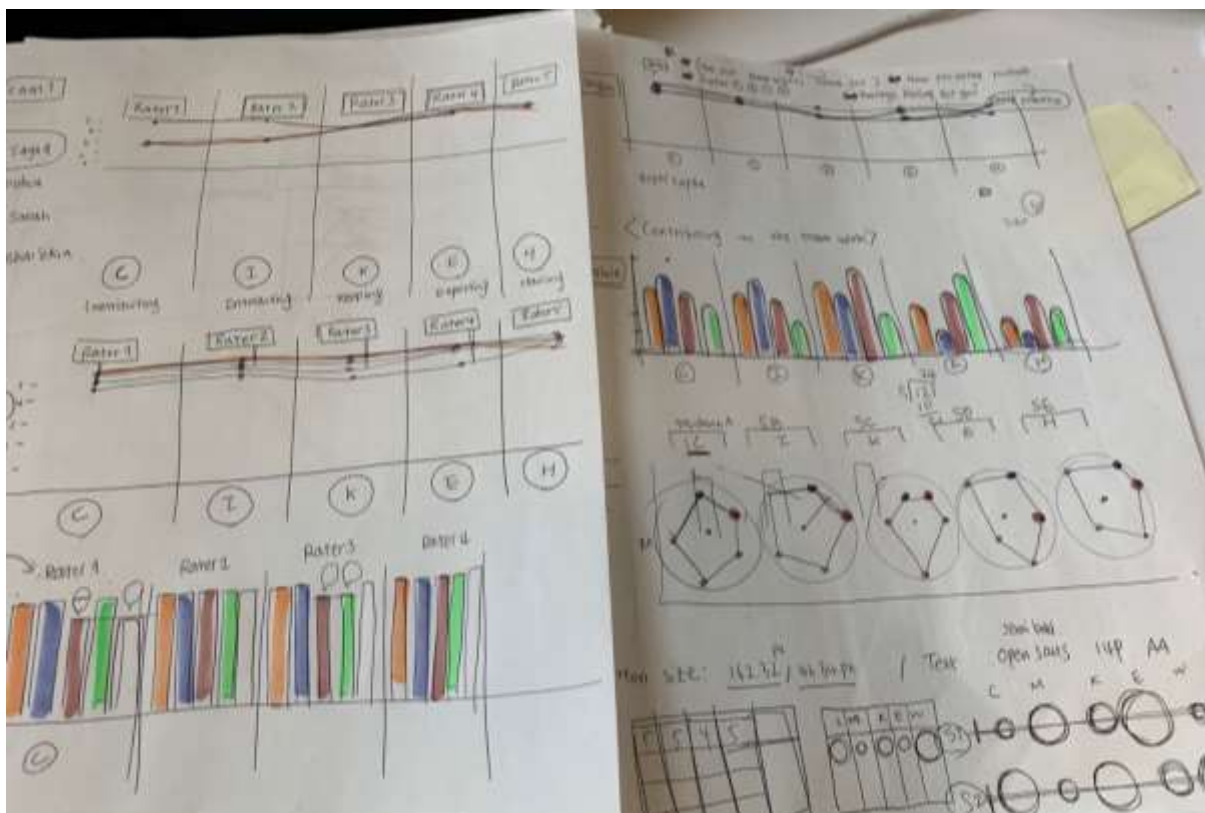

Figure 21. Brainstorming
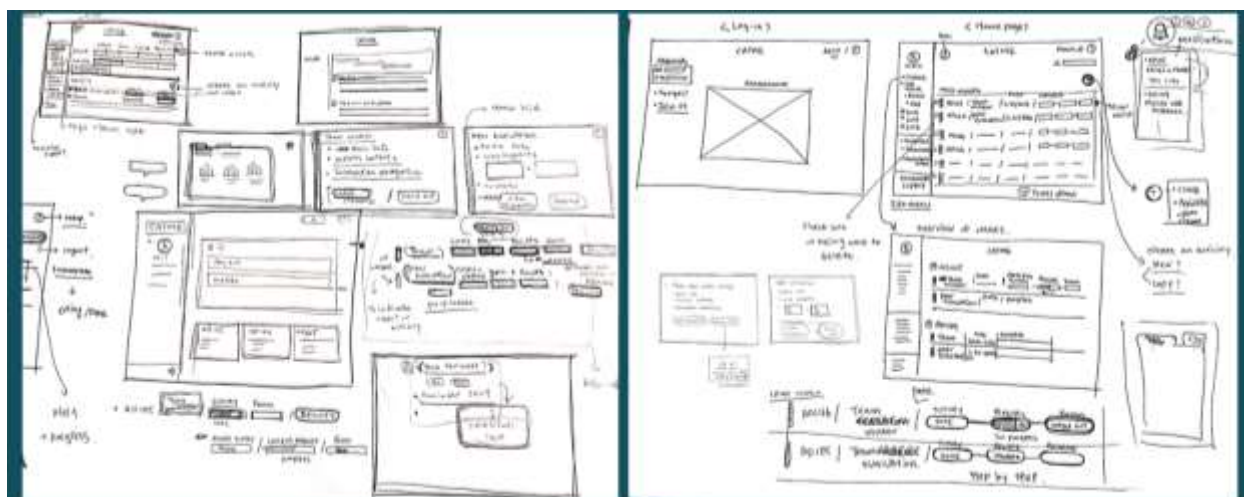
Figure 22. Wireframes

5.3 Prototyping

5.3.1 Low-fidelity Prototype

I transferred the paper sketch into digital prototypes to elaborate on the ideas. With the digital versions, I was able to clarify the overall structure and characteristics of the elements of the interface with more fidelity and discuss the design with team in further details.

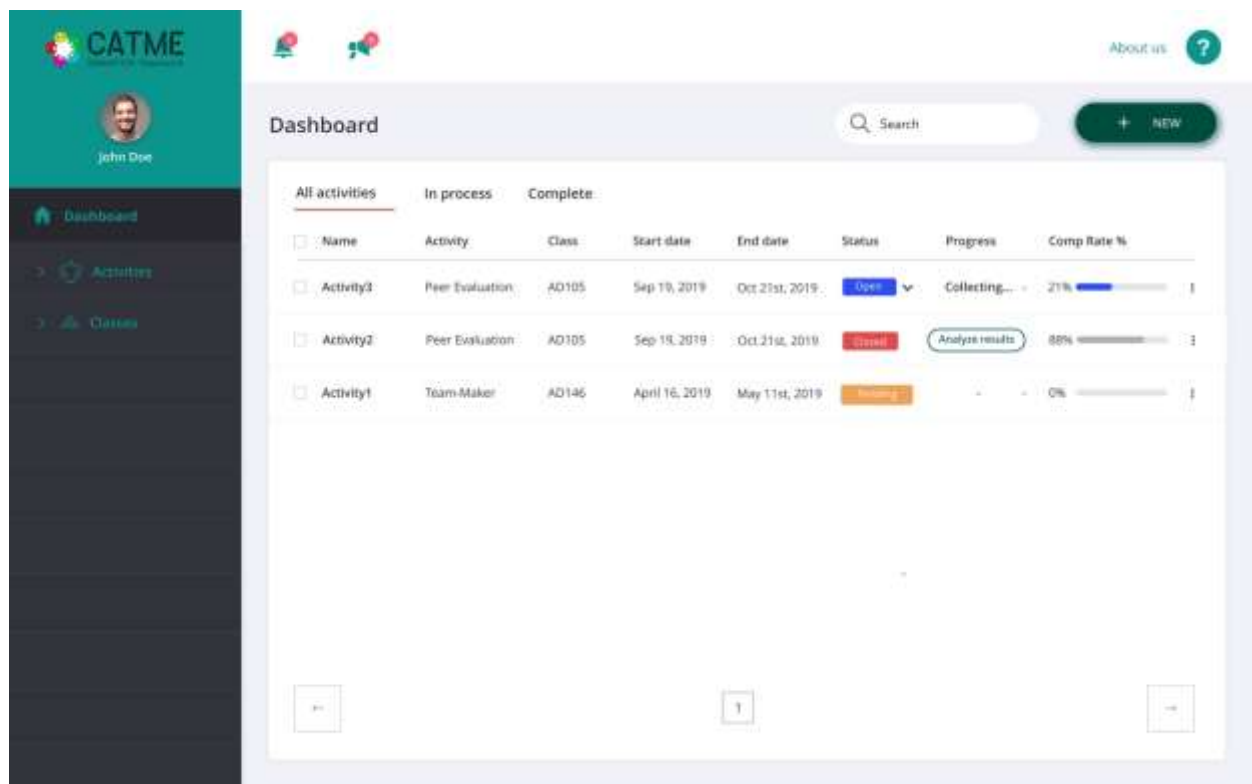After getting more feedback and revising the ideas. I made a high-fidelity prototype for the key pages: the homepage, activity wizard, and data dashboard page.

Figure 23. High-fidelity prototype_ Homepage

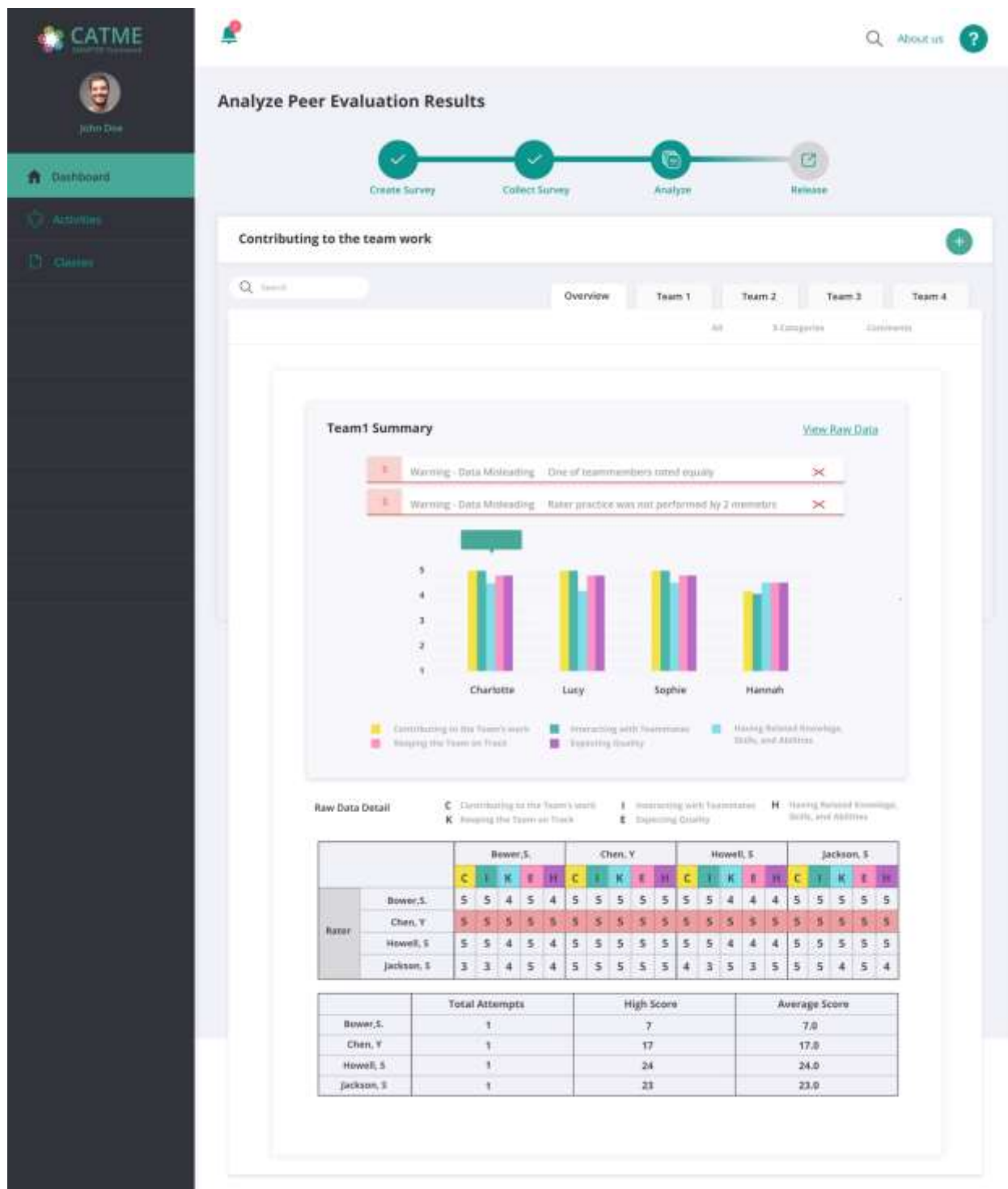Figure 24. High-fidelity Prototype_ Activity Wizard

Figure 25. High-fidelity Prototype_ Dashboard Data

CHAPTER 6   VALIDATION

Since it is impossible to create a perfect user interface at a first attempt, validating design assumptions and ideas with real users is very important to generate a usable product. I conducted usability testing with an interactive prototype. It provides a baseline of user performance and qualitative feedbacks which is invaluable insights to improve end-user satisfaction.

6.1   Usability Testing

6.1.1   Methodology

As a progressive approach, I run two rounds of tests on two different days. Each round held three or four sessions with various different participants, and each session lasted for 30 minutes. Besides a facilitator who asked questions and led the testing, three observers were monitoring the sessions remotely to capture insights and uncover potential issues in detail and accurately. In each round, 3-4 participants were asked to interact with the prototype and complete a set of tasks. In total, seven people, four new users and three existing users, participated in the testing. In the first 5 mins, we asked them about a pretest demographic and background information. Then, the facilitator asked participants to perform a series of tasks. A think-aloud method was used to capture their thoughts during their interaction with the prototype and their behavior, comments, and navigation through the system was monitored.

Table 4. Pre-testing Questions

Pre-testing questions	Demographic questions	• Tell me about yourself. (e.g.,. educational background)
		• On a scale of 1 to 5 (1=not at all confident, 5=very confident), how would you rate your level of confidence in using web-based platforms?
	Prior knowledge and experience with CATME	• On a scale of 1 to 5 (1=not at all confident, 5=very confident), how would you rate your familiarity of CATME?
		• When was the last time you engaged with CATME?

Table 5. During the testing

During the test	Task1	• Please describe your general thoughts about this page. What information are you seeing?
		• What do you think you would find when you click on the 'in-progress' tap?
		• What do you think the symbols ('bell' and 'bullhorn' icons) would indicate?
		• Where do you think if you have questions, you will go on this page?
		• Please play with it without clicking the 'new' button

Table 5 continued

	Task2	**[Scenario]** You are an instructor of AD105 trying to give out a survey for students to evaluate their teammates' performance and behaviors. You have just signed in.
		
		 • Create 'a peer evaluation survey' for teams in 'AD105 Section1'. [We suppose you have your class data in the system already.]
		 • Name: AD105_project2 [Autofill]
		 • Start Date: Today's date [Autofill]
		 • End Date: Seven days from now [Autofill]
		 • Categories:
		    o Contributing to work
		    o Having knowledge/skills
		    o Follow-up questions
		    o Team Conflict
		    o Psychological safety
		 • For something not specified here, do not adjust it.
		 • Require 'a rater practice' and allow 'unlimited' times.
		 • Release peer-to-peer comments
		 • Enable Peer-to-peer comments
		 • Release Do not anonymize
		 • Inactive 'delegate Instructors'
		 • In the 'review' section, edit 'categories' section and add 'Interacting with Teammates' category.
		 • Preview a student's view. Select 'Diaz, Judith.'
		 • Go back to the 'wizard.'
		 • Finish the task.

Table 6. Post-testing Questions

Post-testing questions	• Is the information on the screen useful/clear? • What questions do you have? • Is there anything missing this page? • Do you think a new user without experience will find it intuitive and easy to use? • Whom do you know that would like this product? • What are they like?

6.2 Usability Testing Result

In the testing sessions, both qualitative and quantitative data were gathered. For the quantitative tests, we gathered the successful task completion, error-free rate, and critical error rates to determine the success of the solution. We also gathered qualitative data by observing their interaction and feedback.

6.2.1 Pre-testing Questions

In the first five minutes, the facilitator asked participants about some demographic questions such as their teaching experience and educational background. Also, they were asked about their confidence in dealing with web-based platforms as well as prior knowledge or experience with CATME which might affect the testing result. The result (Figure 26) shows that the participants have various level of confidence in using web-based platforms and familiarity with CATME.

Figure 26. Pre-testing Result
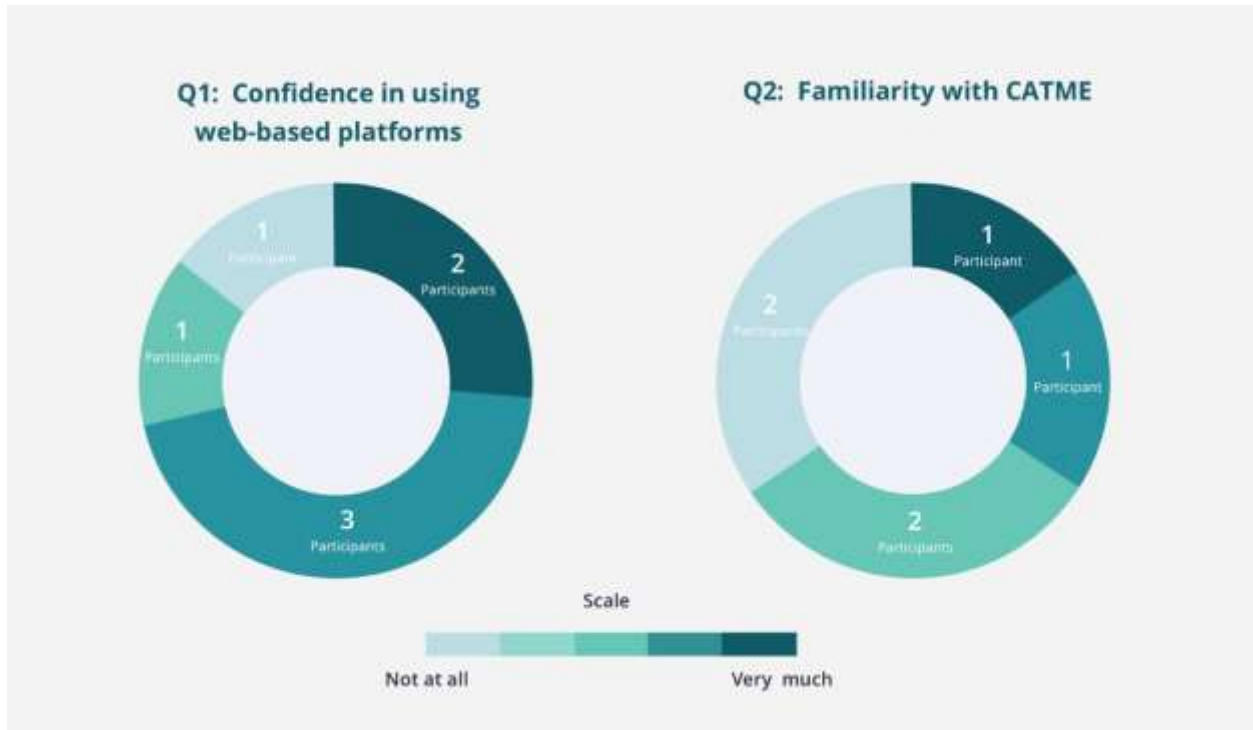
- **During the Testing :** While the participants were interacting with the prototype, we gathered a successful task completion, error-free rate, and critical error rates to determine the success of the solution. (Figure 27) The result reveals that although 71% of participants managed to complete the tasks, 58% of them experience critical errors that deter them from succeeding in the tasks.
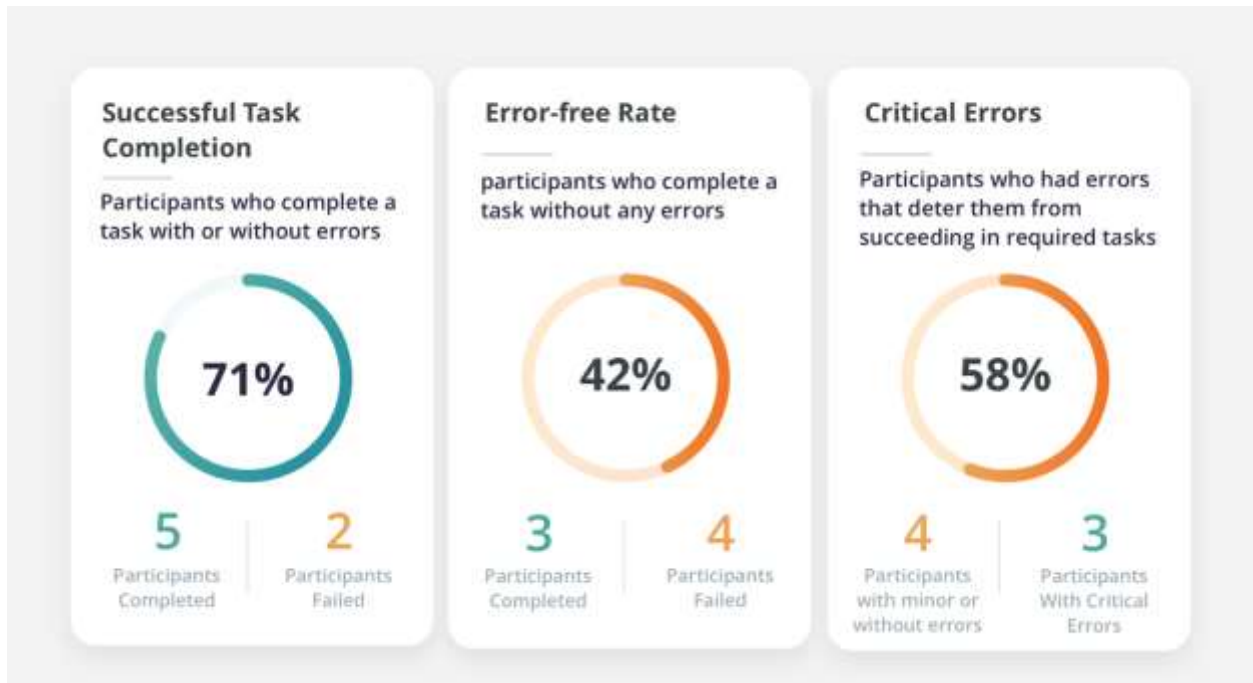
Figure 27. Task Result

- **User Feedback**

During the test, we observed their interaction with the interface and made a note of where usability issues arise. The think-aloud method allowed us to capture the cause of misconception and their direct comments. With the insights, I prioritized the problems based on frequency, and I was able to identify problem areas that need to be fixed.
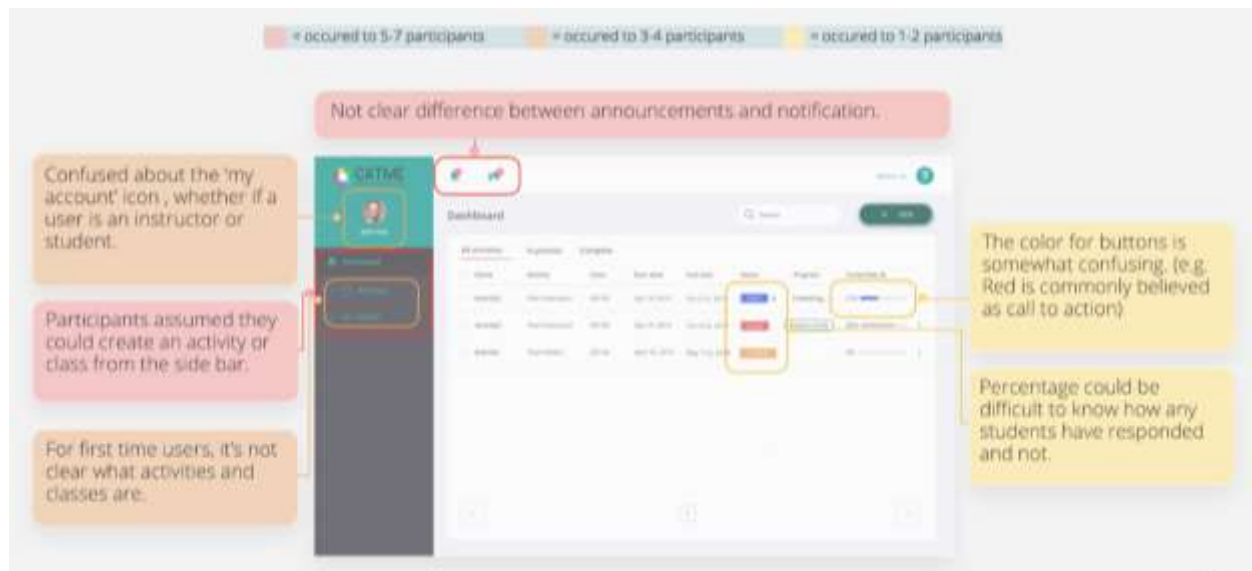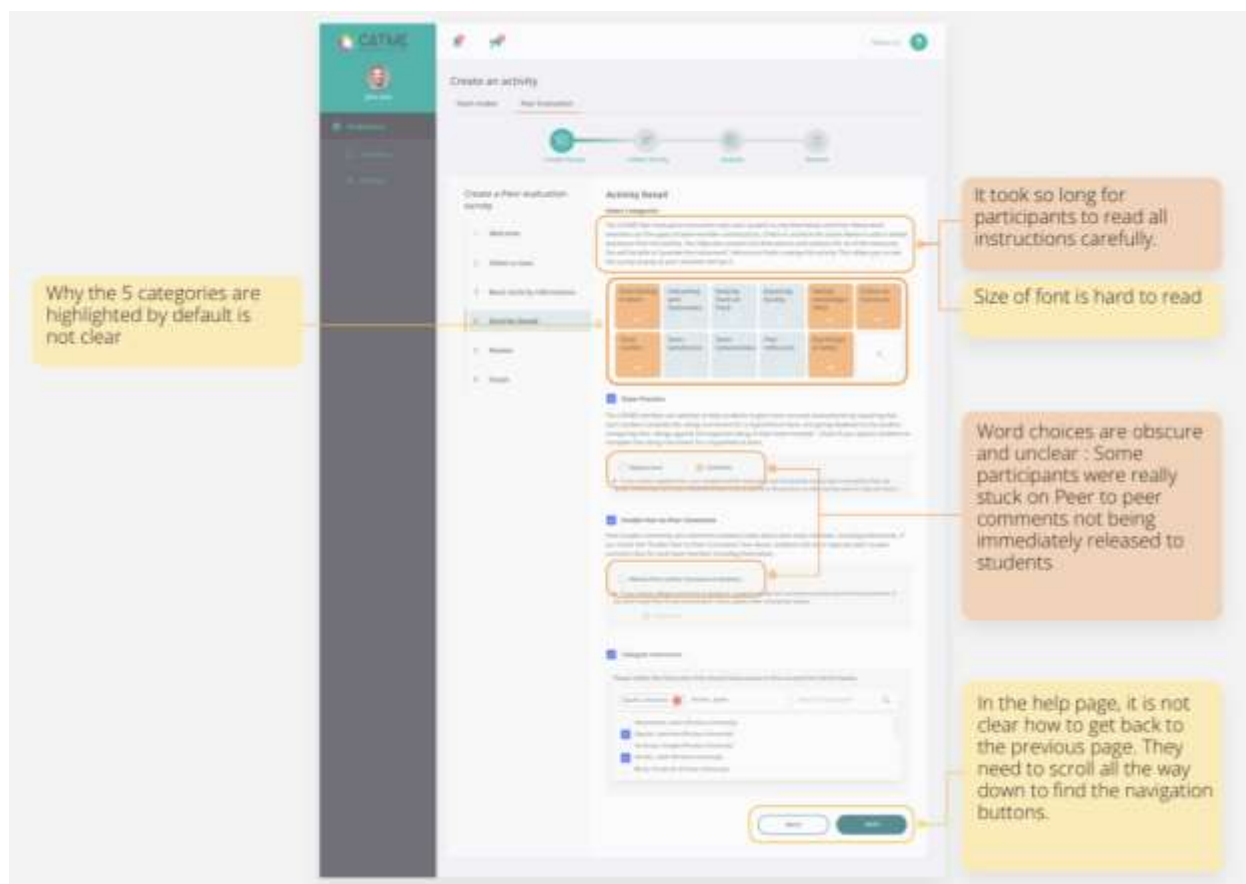
Figure 28. User Feedback

Figure 29. User Feedback

6.2.2 Result Summary

The result for usability metrics such as participants' success and error rates in the tasks revealed that the prototype has critical usability issues. Based on the feedback from participants (Figure 28&29) the majority of errors occurred on the homepage were related to users' different perception of elements incorporated in the interface. For example, the bell icon and bull horn icon used in the top left corner of the home page (Figure 28) cause confusion to users because they interpret the same element differently. Also, another key point need to be accounted for is that the users felt that the activity wizard had too much text and still overwhelming.

6.3 Refinement & Visual Design

Based on the feedback from the usability testing, I modified and finalized the design. I fixed the perception problem by minimizing the use of different icons to prevent misunderstanding. In addition, to solve the information overload, I simplified a lot of verbose explanation in pages.

6.3.1 Redesigned Homepage (Figure 30)

a. **Clear hierarchy in items**: Instead of putting two similar tables, I created activity and class panels with clear labels. In this way, not only faculty can see recently created surveys, but also they can get an overview of classes they are managing. Users can create two types of surveys: team-maker and peer evaluation. Also, the existing homepage displays surveys chronologically, but it is hard to differentiate what type of survey

b. **Communicating primary functions**: Previously, there was no direct buttons or menu bar to use CATME's primary functions on the homepage. The redesigned

homepage has a 'create' button on the top right corner. I used the high contrasting color for the button to draw visual attention. Also, there is a collapsible menu bar on the left side to take users to the main features.

c. **Grouped items**: I placed relevant elements close to each other so that users can find related items effortlessly. For instance, all items about the account such as a logout and my profile hyperlinks are placed underneath a user's profile picture.

6.3.2 Redesigned Wizard (Figure 31)

a. **Minimized steps**: The current activity wizard has too many steps need to be taken. For the new interface, I narrowed them down into six pages by combining steps such as the license and delegation teacher page which don't change everytime users make a survey. Also, I incorporated an auto-fill feature. Once users put information, the system will remember it so next time when users create a survey the information will automatically appear until they change it. It enables existing users don't have to repeat the same thing and ease the process.

b. **Simplified interface**: The exsisting wizard interface has too many words explaining each step that users don't read after their first-time use. Having too many unnecessary information on one page makes interface distracting. I simplified the pages by hiding the long explanation into an icon next to each labels. When they need information, they can click on the icon to find the information.

c. **Status Bar** : Not only I put the status meter on the left side of the interface to show where they are at in creating survey activity, but also I incorporated a status bar to indicate next steps need to be taken to achieve goals in the system.

6.3.3 Evaluation Result Dashboard (Figure 32)

a. **Visual Aids:** For the new interface, I utilized visual elements (e.g., color, graphics, and shape) to make data engaging to users and also to prioritize data visually. For example, the CATME's five dimensions are highlighted in colors so that it draws more visual attention than additional other data.

b. **Contexture Help:** Currently, some values like an adjustment factor in the dashboard is hard to understand because of the lack of contexture help. In the new interface, simple explanation about each data is provided when users hover over the items
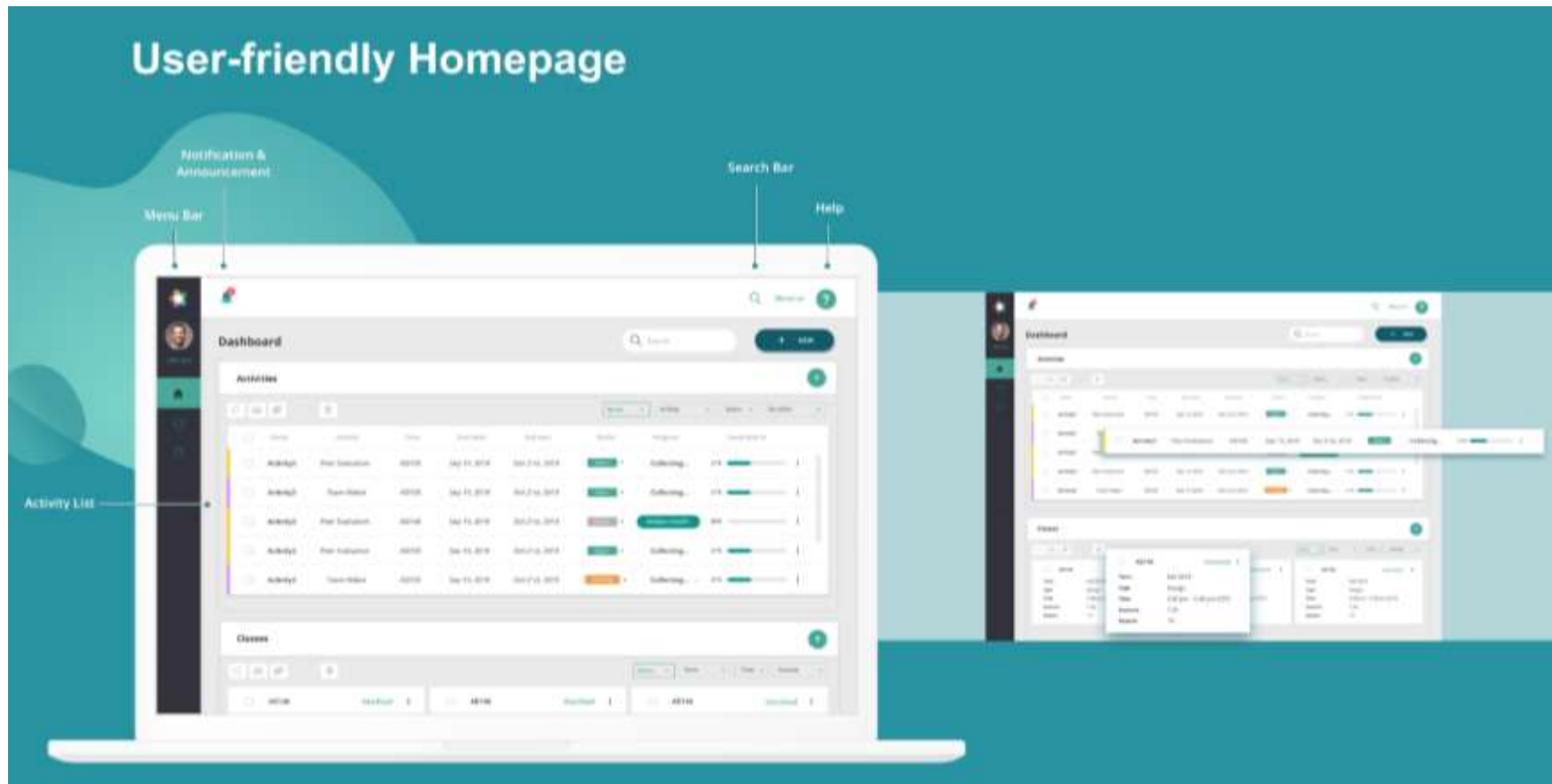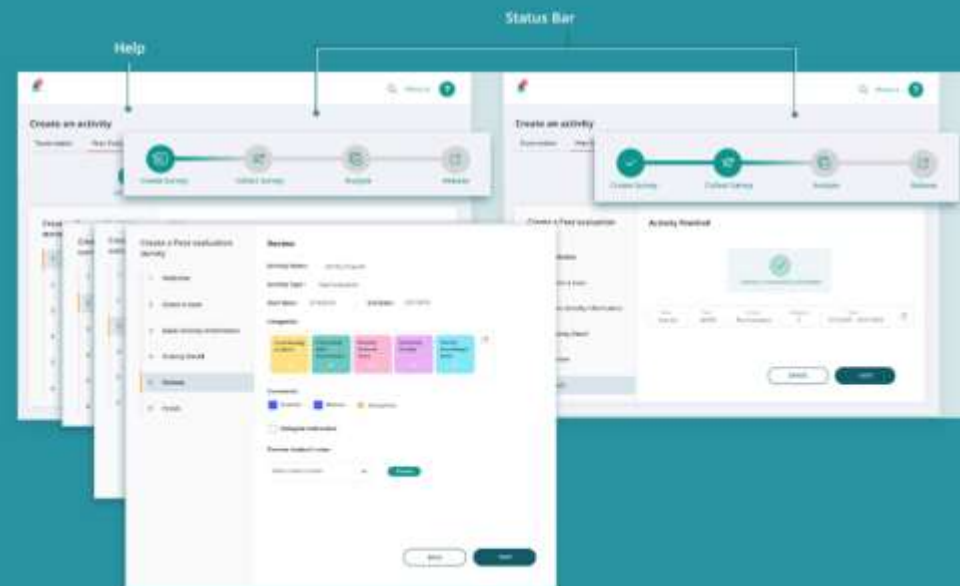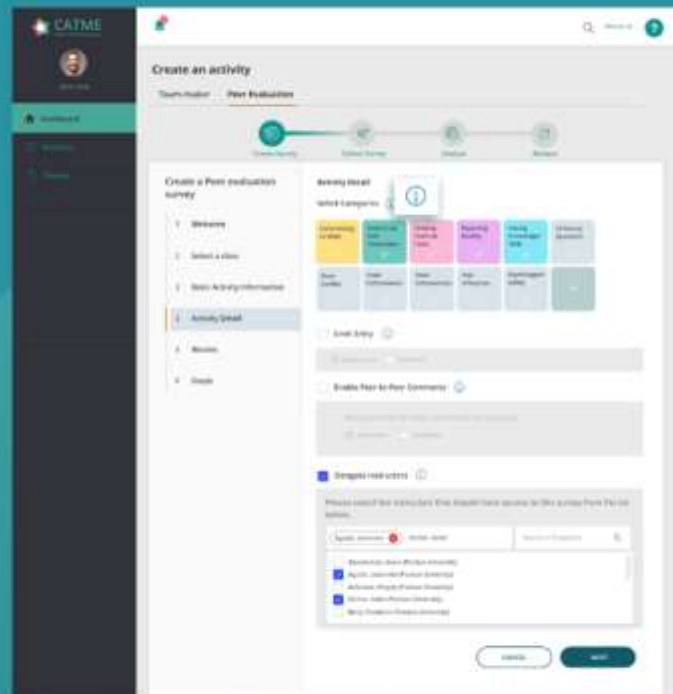
Figure 30. Redesigned Homepage

Figure 31. Redesigned Activity Wizard
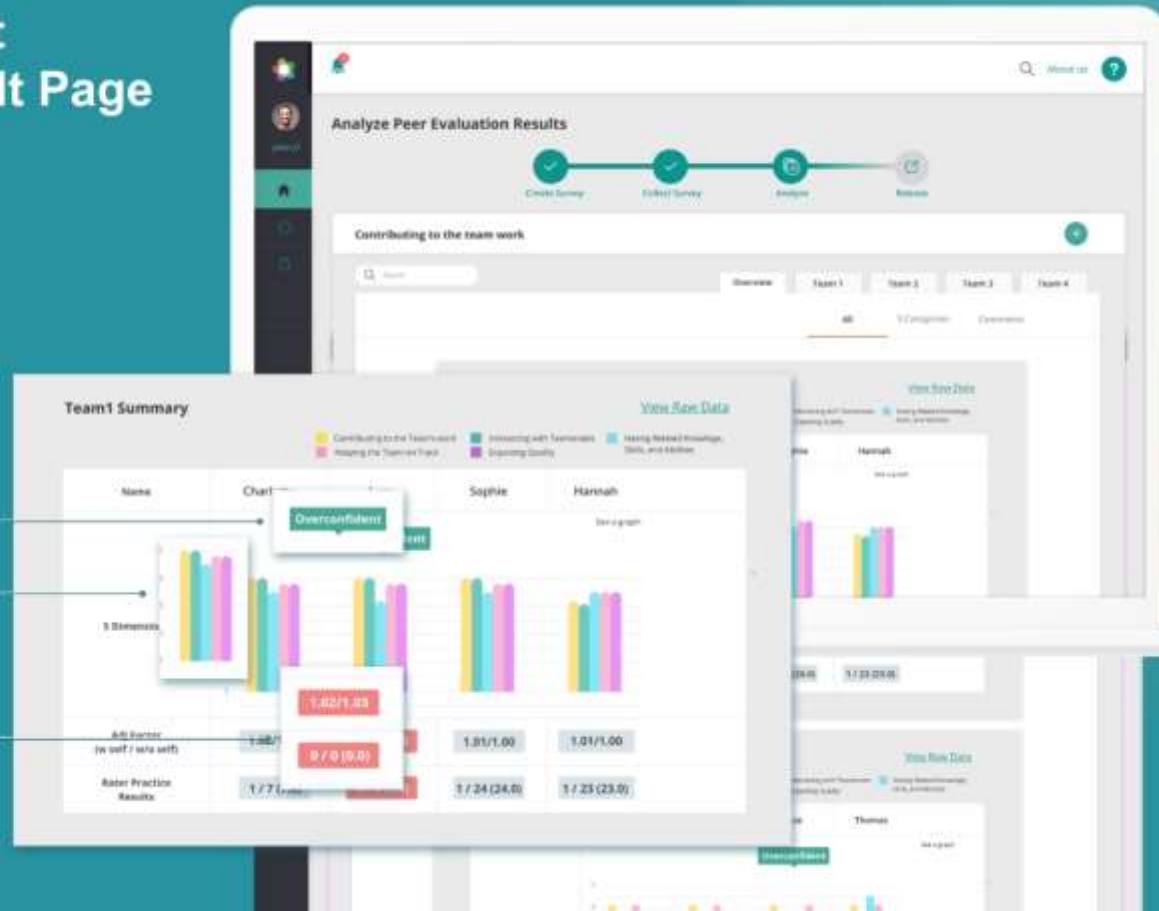
Figure 32. Evaluation Result Dashboard

6.4 UI guidelines

To ease the implementation process, I created a UI guideline (Figure 33 & 34) displays all items used in the interface. It includes sets of recommendations defining items repeated in the design -- from buttons to layout of the user interface. This method is crucial for this study in many ways. Constructing a clear guideline bridges designers and engineers, and also it is an important step for the future direction of this project.

With the faculty and student team's collaborative efforts, CATME has grown and expanded exponentially in recent years. As the system grows, there has been a constant new addition to the team. Having a clearly defined UI guideline will significantly help communicate and implement the design ideas no matter when and by whom it is executed in the future.

Figure 33. UI Guideline1

Figure 34. UI Guideline2

CHAPTER 7   CONCLUSION

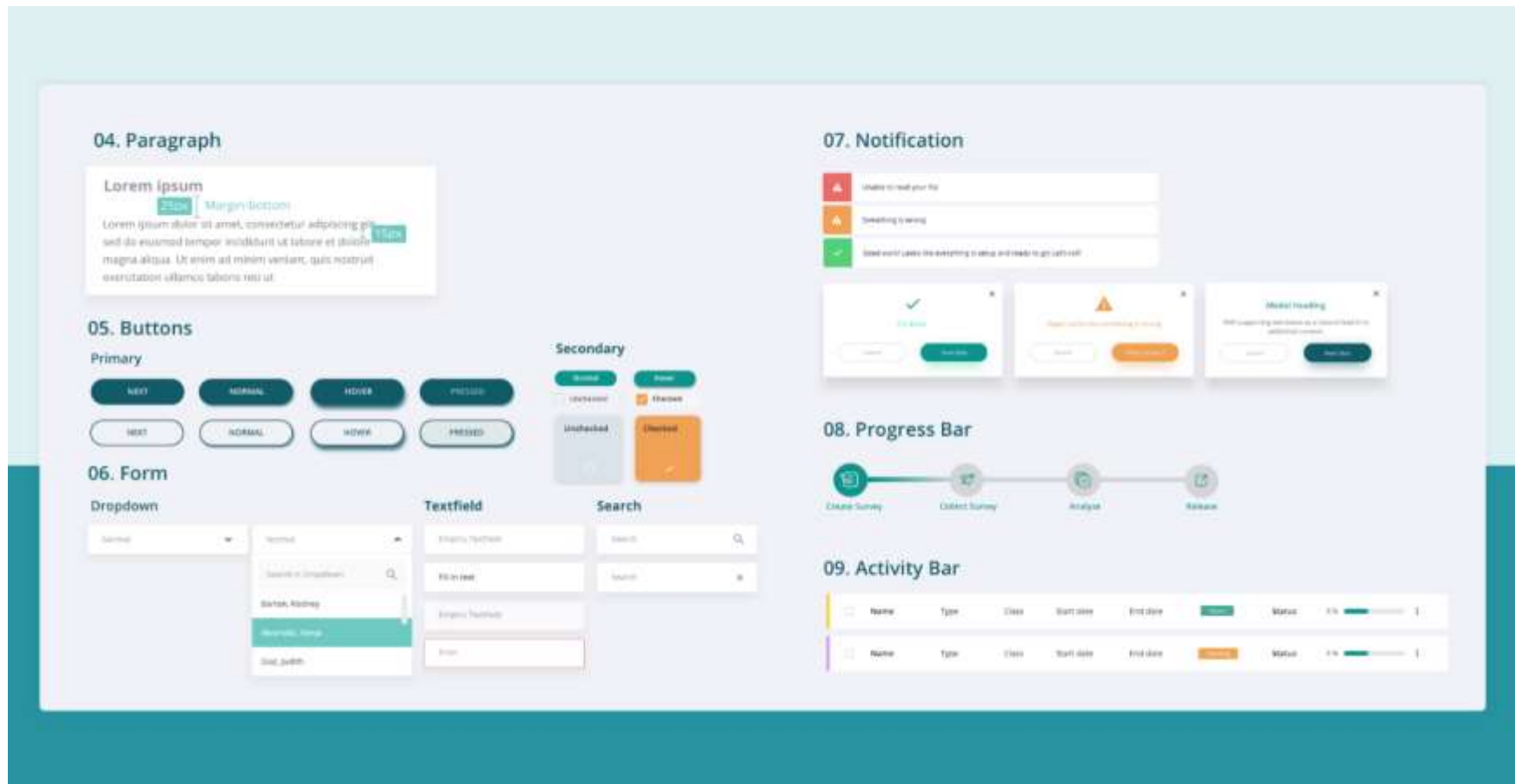In this study, I redesigned CATME's key pages to improve user experience using UCD (User-centered Design) as the main framework. To avoid just reshelling the package, a lot of time and effort was spent upon conducting robust background and user research to truly understand target users' interaction with CATME. Through the research phase, I was able to identify three key user problems. Firstly, the interface and navigation flow are not intuitive for first time users. The second problem was that interpreting is confusing and unintuitive. Lastly, users have problem handling issues in teams and ensuring students' improvements.

This study shows how the key usability problems were applied and considered throughout the overall design process. Every design decision was backed up by the user needs, constantly iterated, and evaluated. With the iterative usability testing and constant revising, we have succeed in creating user friendly and intuitive user interface for CATME's three key pages. Although the result is yet conceptual and not implemented, I believe that it is a big step to improve user experience in CATME as now we have a better understanding of their interaction with the system.

CHAPTER 8   LIMITATIONS

Scope

This project was limited by time constraints. Due to the time limit, we narrowed down the project scope. As was mentioned in the Scope, we aimed to redesign the system for new users and three key pages. Therefore, the findings might not be generalized to the existing users and the entire system. To achieve improving user experience for all users throughout the system, further work will need to be performed. Also, future work should consider accessibility for visually impaired or blind users.

Usability testing

Even though the usability testing tremendously helped to capture users' experience with the redesigned interface, it was limited in several ways. First of all, the interactive prototype had technical issues which might have affected user interaction. Second of all, because of the limited testing time, the participants only interacted with the homepage and activity wizard pages. Future testing should aim at preventing technical problems and evaluating the data dashboard page as well.

Although the outcome of this study has been promising, I hope that further study will confirm our solutions. More research should be undertaken to develop further and enrich the design.

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