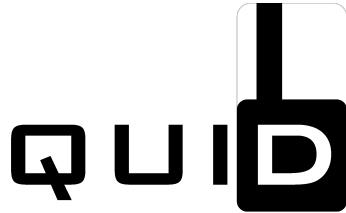


Project 2: Usage Research Data Elicitation and Analysis

Group 6



QUID
Quality User Interface for Dining

In collaboration with
Owens Food Court at Virginia Tech



Team Members

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This project involves collecting data through interviews and observations to understand user needs and work activities, these findings are then used to create a work activity affinity diagram.

CS/ISE 5714 - Usability Engineering - Fall 2023

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1. System Concept Statement

Quality User Interface for Dining (QUID) is a redesigned Point Of Sale (POS) interface developed specifically for Owens Food Court at Virginia Tech to improve cashier experience at the register while processing transactions. QUID will resolve the improper layout strategy, which often yields incorrect item selections and presents a lack of distinction in food items or frequently purchased commodities like drink cups or compostable boxes, to reduce processing time and voided transactions. QUID will ensure only available items are displayed, provide consistent and commonly used names on button labels, and process payments with less intervention. For example, when a customer selects a restaurant, QUID prominently displays the restaurant's logo and color theme, creating a visually distinct environment. Crucially, QUID generates payment confirmations, bolstering transparency and trust in financial transactions. QUID, backed by its cashier-friendly interface, represents a comprehensive solution for Owens Food Court, promoting operational excellence and customer satisfaction.

2. Project Scope Tailoring

We interviewed four cashiers, who are our representative users for this project. We not only conducted user interviews but also stationed ourselves near the Point of Sale to observe cashier interaction with the POS. Along with this, we interviewed the chief cashier officer to understand the instances where a manager has to step in to resolve the issues a cashier faces. Thus, giving us a picture like never before of the cashier register and its dynamics. We feel this was necessary to understand the user needs in a holistic view and not just from one perspective.

The challenging part was observation, as the queue in peak hours is extensive and it was hard to note down a few observations, thus we waited until the cashiers had ample time to help us understand their workflow.

Question generation came naturally as one of our members is a cashier at Owens, this team member was able to provide an overall understanding of the system and how it works, as well as pain points to touch on in interviews. This person did not participate in the interview process but helped with note-taking. This was done to avoid any biases or lead the users in the process.

During the interview with Mr. Andrew Cox suggested we interview the Hokie Dining system administrators to better understand the history and evolution of the POS system. Due to time constraints in completing this deliverable, we were unable to interview the system administrators, but hope to do so shortly after this report's completion. Following is the information of people yet to be interviewed.

1. Sandra Davis

Administrative and Systems Specialist

Responsibility: Responsible for adding and removing food/ food menus, changing of layout, and adding any buttons to the cashier register. Handles a lot of other things relevant to policy making and financials in the dining hall

2. Teresa

Ex-Chief Cashier Officer

Responsibility: Currently looks over inventory updates in the system and chalking out new policies for the financial management of all Dining halls in Virginia Tech

We will eventually interview customers and try to capture the interaction with cashiers and their sentiments about the payment methods at the POS.

3. Preparation Process for Interviews and Observations

To prepare for interviews, we began by writing questions, as we believed this to be the most crucial part of the interview process. Initially, we met outside of class and created a shared document for all questions. During this brief meeting, we discussed how we would go about composing the questions. Some team members preferred to brainstorm and write questions first, followed by a review to ensure they covered essential aspects, and to organize questions by topics if needed. Conversely, other team members preferred to start with topics and then generate questions based on them. Examples of topics included the user experience with the POS system and the physical work environment. We believed that employing a combination of both methods would yield the most valuable questions.

This exercise of question writing was primarily conducted individually, allowing each member to contribute by either adding new questions or editing existing ones. After composing all the questions, we reviewed them to ensure they addressed most aspects of the Owen's Hall Food Court work experience and the POS system. Since our project involved two types of users (Cashiers and Chief Cashier Officers), we created two distinct question lists: one for the chief cashier officer and another for cashiers. We have our lists of questions in the upcoming sections of this report.

While we were in the process of writing the questions, we also reached out to our client and began collecting potential users' contact information in order to arrange and schedule interviews. Most of our communications were conducted either via email or in person. The interviews were carried out in various locations on the Virginia Tech campus, such as the Squires Student Center and the Graduate Life Center. For each interview, we ensured that at least two members of our team were available. We did this to gain multiple perspectives and to guarantee we had a dedicated interview lead and a note taker. We believed that one person performing both tasks would be challenging. Additionally, we recorded each interview after obtaining permission from the users. Despite our internal requirement to have at least two members present, we actually had a minimum of three members in each interview, which allowed for more efficient data collection.

Regarding observations, we visited the worksite twice, expressly for this purpose. The first visit aimed to get a basic understanding of how things worked and to observe the cashiers in a general manner. Consequently, this visit was focused on obtaining an initial grasp of the system. The purpose of our second visit was to explore the system more deeply. Our second visit was longer in duration and involved watching closely and taking pictures, notes, and sketches. Our second visit helped us profoundly understand what, how, where, and why things were done. While observing, we wrote down questions about areas that were confusing or needed clarification in order to gain a better understanding of the system. Resultantly, we more fully understood the system after these two visits. In the subsequent sections of this report, we will showcase pictures, notes and sketches we created.

4. User Profiles

We interviewed one Chief Cashier Officer and four Cashiers as listed below.

- **Name:** Mr. Andrew Cox aka Doy
- **Role:** Chief Cashier Officer
- **Experience:** Experienced in working on POS at Walmart and Target as well.
- **Responsibilities:** Verifying and keeping track of cashier activities, clerk cards and financial reports done in the food court, providing In-person training for new cashiers and making them certified cashiers

The four cashiers interviewed are as follows:

- **Name:** Gift Wanapongpiasarn
- **Role:** Student Manager and Cashier at Owens food court
- **Experience:** four months as Cashier
- **Responsibilities :** Training new employees, on-boarding new cashiers and helping the shop-leaders to keep the shop running smoothly.
- **Name:** Jack Peterson:
- **Role:** Student General Manager
- **Experience:** He did cashier training two years ago. Most knowledgeable and senior in terms of working at Owens as a student general manager and is mostly proactively involved in pretty much everything in the food court.
- **Responsibilities:** Scheduling, sending out emails, protocol guardian, assigning shifts to employees on a daily basis, is on the register in busy hours and helps smoothen the peak hour rush at the cashier counter
- **Name:** Ahmed Osman
- **Role:** Student Employee - Certified Cashier
- **Experience:** 2 years serving as a cashier
- **Responsibilities:** Processing Dining Transactions
- **Name:** Calvin Thai
- **Role:** Student Employee - Food Prep/Cashier/Assistant Manager (West End Market)
- **Experience:** 2 years, ~ 1 year as food prep worker and cashier, ~1 year as assistant manager.
- **Responsibilities:** Preparing food; processing transactions; helping shop-leaders run West End smoothly.

5. Interview Questions

Having developed the concept statement and carried out POS system observations, the team developed two unique sets of questions for the manager and the cashiers as separate user roles of the POS. The following questions were developed for the cashier's semi-structured interview:

1. Can you describe your typical workflow when using the current POS system?
2. What tasks do you find most time-consuming or challenging when using the POS system?
3. Are there any specific features or functions of the current POS system that you find particularly helpful?
4. What kind of training or onboarding process did you go through when you first started using the POS system? Were there any aspects of the training that were particularly helpful or lacking?
5. Can you share any instances where the current POS system caused errors or discrepancies in transactions? How were these issues resolved?
6. How do you manage inventory and track product availability with the current POS system? Are there any improvements you'd like to see in this area?
7. How do you handle customer payments and payment methods with the current POS system? Are there any features or options you think would enhance this process?
8. Can you share any feedback or suggestions for making the user interface of the POS system more intuitive or user-friendly?
9. Have you encountered any downtime or technical issues with the POS system? How were these issues resolved, and what improvements would you suggest to prevent them in the future?
10. Are there any additional features or functionalities you would like to see added to the POS system to make your job easier or more efficient?
11. Are there any instances or incidents as a cashier that you feel were bad experiences? Why? And what would have made it better?
12. What is your experience with the workstation (table, chair, screen,...)?
13. Can you explain in your own words the customer experience (steps that need to be taken when approaching you until they leave)?

14. What are the risks to you as a cashier officer from using the POS?
15. What functions do you think should be removed from the POS system?
16. Do you have any thoughts or comments regarding the POS interface design (e.g., icons, colors, fonts, layout.)?
17. Are there any aspects, features, or things we did not touch upon?

Regarding the manager, the questions we developed were:

1. How long does training a new cashier on the POS take?
2. What are your opinions on the current POS system?
3. Could you mention some specific experiences that you use as an example to train cashiers? What does your responsibility as an officer entail?
4. With cashiers, have you had instances that are challenging to handle at the moment?
5. Any particular feature that annoys you on the system ?
6. What features do you like in the current POS interface?
7. What are the least used features you feel are not important?
8. Can you explain in your words the customer journey (when entering Owen's hall until leaving?)
9. How long does a menu change take to implement on the system?
10. How would you describe the role of the POS system in the daily operations of your business?
11. What key performance indicators (KPIs) or metrics do you monitor regularly using the POS system, and how do they influence your decision-making?
12. Can you share any specific instances where the POS system has contributed positively to your business operations or bottom line?
13. Conversely, are there any instances where the POS system has caused disruptions or issues in your business operations?
14. How do you ensure customer data security and compliance when using the POS system, and are there any concerns or improvements you'd like to address in this area?
15. How does the POS system support your inventory management and tracking processes? Are there any features or functionalities you find particularly useful or lacking in this regard?
16. Are there any challenges related to employee management, such as access control, permissions, or reporting, that you face with the current POS system?

17. How do you handle customer loyalty programs, promotions, or marketing efforts using the POS system, and are there any improvements you'd like to see in this area?
18. Can you describe any integrations with other systems (e.g., accounting software, e-commerce platforms) that you rely on alongside the POS system? Are there any issues or improvements you'd like to see in these integrations?
19. How do you track and manage sales trends, customer behavior, or other business analytics with the current POS system? Are there any additional analytics or reporting capabilities you wish you had?
20. Do you receive adequate support and training resources for the POS system, both for you and your staff? How can training and support be enhanced?
21. What is your experience with system updates and maintenance? How do you ensure that these updates do not disrupt business operations?
22. Are there any customization options or preferences you have for the POS system to better suit your business's unique needs?
23. Can you describe your experience with the POS system's scalability? How well does it adapt to changes in your business, such as growth or seasonal fluctuations?
24. How does the POS system handle multi-location or franchise operations, if applicable to your business? Are there any challenges or improvements related to this?
25. How do you handle pricing and product management with the current POS system? Are there any features or options you think would enhance this process?
26. Are there any cost-related concerns or considerations with the current POS system, such as ongoing subscription fees, hardware maintenance, or additional charges for certain features?
27. In your opinion, what would be the ideal POS system for your business, and what features or capabilities would it include?
28. What would be a cool feature on the cashier's end?
29. Do you think a live counter of voids would be good for a cashier to have?
30. Is there a feature to turn off a specific shop on a given day?
31. Are clerk cards provided with the system, is this something custom that we make? Who suggested them, and where did they come from?
32. Can you explain the walkout system?
33. Are there any key features worth mentioning that we haven't talked about?
34. Any weird or traumatic situations in your experience?
35. From Walmart or Target, if you could add anything from there to here:
36. Why don't we handle cash anymore?

6. Initial Meeting Overview

In our meeting with Mr. Doy, we listened to his unique perspective as the chief cashier officer of Owens. Mr. Doy presented the unique case of a user with elevated permissions as compared to a traditional cashier, but still with plenty of usable experience serving as a cashier. Mr. Doy also formerly worked at large retail organizations with their own distinct POS interfaces, and provided context on those retail systems as compared with the dining services POS.

In our meeting with Gift, she provided her unique perspective as a fairly recent hire at Owens, and a novice's take on the interface. This provided us with fresh insight onto the training program and its potential shortcomings. Gift made us aware of what aspects in the current POS go relatively uncovered in training and go completely unused in practice.

From our meeting with Calvin, we learned the differences between West End Market's POS as compared to the Owens POS - both locations offer multiple shops within, but have completely different POS ideologies. Calvin was able to highlight ideal features from the West End POS that could be implemented in a revised POS design for Owens, as well as failures in the West End POS to avoid in our redesign efforts.

In our meeting with Ahmed, he provided insightful information about the system, specifically regarding the payment process and methods, and voiding process. He was also one of the cashiers who had the chance to use both the old and current POS systems. Among the cashiers we have met, it seems he had the most positive user experience with the current POS system.

During our meeting with Jack, he provided us with information from both his managerial and cashier experiences. From a managerial standpoint, he discussed the training and how outdated it was, the issues with doing system updates, payments and inventory tracking, overall system flows, main questions cashiers have when he is training them etc. From a cashier's perspective, he explained the main issues he faced as a cashier, his perspective on the system, plus and minus points. His thoughts on which parts of the system are good and which need to be improved. Overall we were able to gain

insights about the whole system through his meeting.

7. Gathering Raw Work Activity Data and Data Types Collected

The team used a comprehensive approach to gather raw work activity data, primarily through interviews and observational techniques. The data collection process involved the participation of both cashiers and a chief cashier officer, ensuring a well-rounded perspective.

A total of five interviews were conducted with the participants. These interviews were structured, with prepared questions, yet open-ended to encourage participants to share their thoughts, experiences, and any challenges they encountered while using the cashier console. The interviews provided qualitative insights into the users' feedback, comments, and their preferences regarding the current system.

In addition to interviews, observations were a key component of data collection. The team closely observed the work activities of cashiers, noting their interactions, choices, reactions, and how they engaged with customers purchasing food. The observational data helped provide context and a deeper understanding of day-to-day cashier activities, the layout of the food court, and the entire process from a customer buying food to interacting with the cashier to complete the transaction.

The collected data encompassed both textual information and recorded materials from the interviews. Qualitative data included participants' verbal feedback, comments, and insights. Meanwhile, interview sessions were recorded to ensure accurate documentation of the conversations and to capture nuances that might not be evident solely through written notes.

This raw data served as the foundation for further analysis and the creation of a Work Activity Affinity Diagram (WAAD) to visualize and interpret the relationships between various work activities and inform potential improvements in the cashier interface and overall food court operations.

8. Work Artifacts

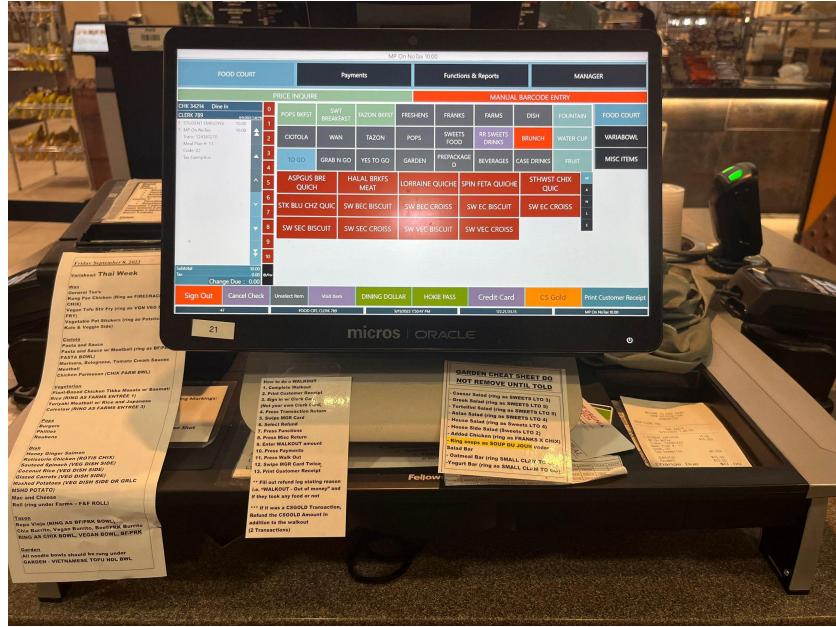


Figure 1: The Point of Sale workstation at Owens food court showing several cheat sheets and guidance sheet for any special update for the cashier to know

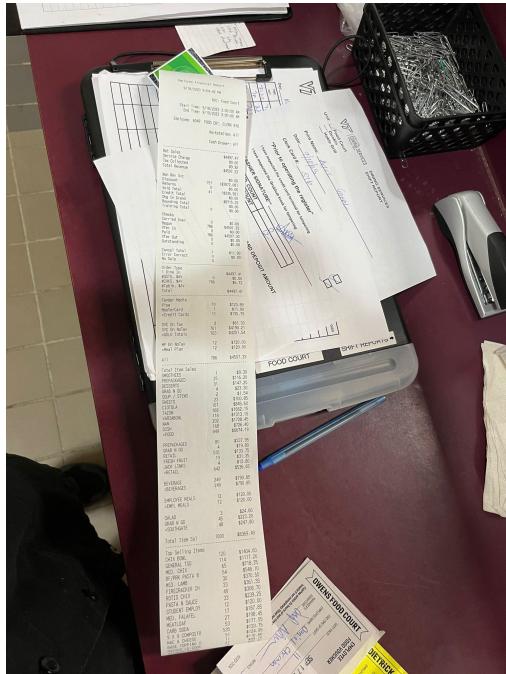


Figure 2: Financial reports cashier has to submit at the end of the shift



Figure 3: Employee meal passes and credit card transaction bills submitted at the end of the shift by cashier



Figure 4: Two-way radios (walkie-talkie used to communicate to the managers by the cashier)



Figure 5: Payment options: Credit Card reader (Left); Hokie Passport reader (Right)



Figure 6: Scanner kept in the center of the register providing access for both lines

Figure 7: Clerk card check-in and check out log

9. Photos of Work Environment

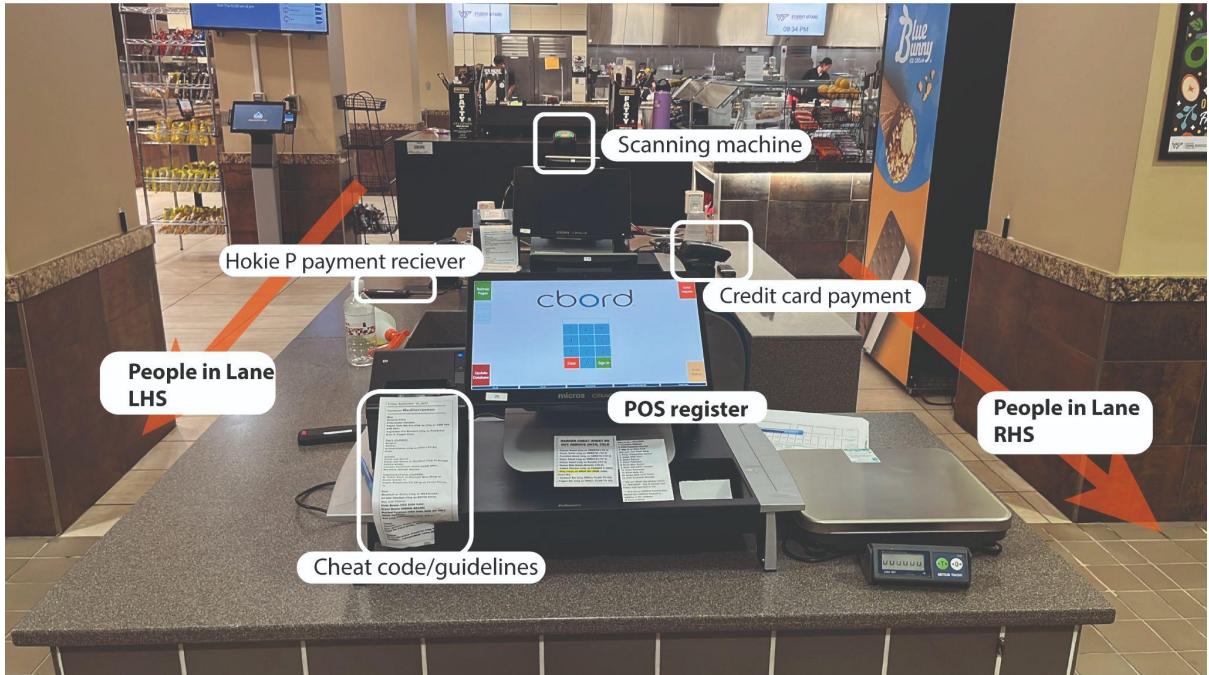


Figure 8: Overall system at cashier register

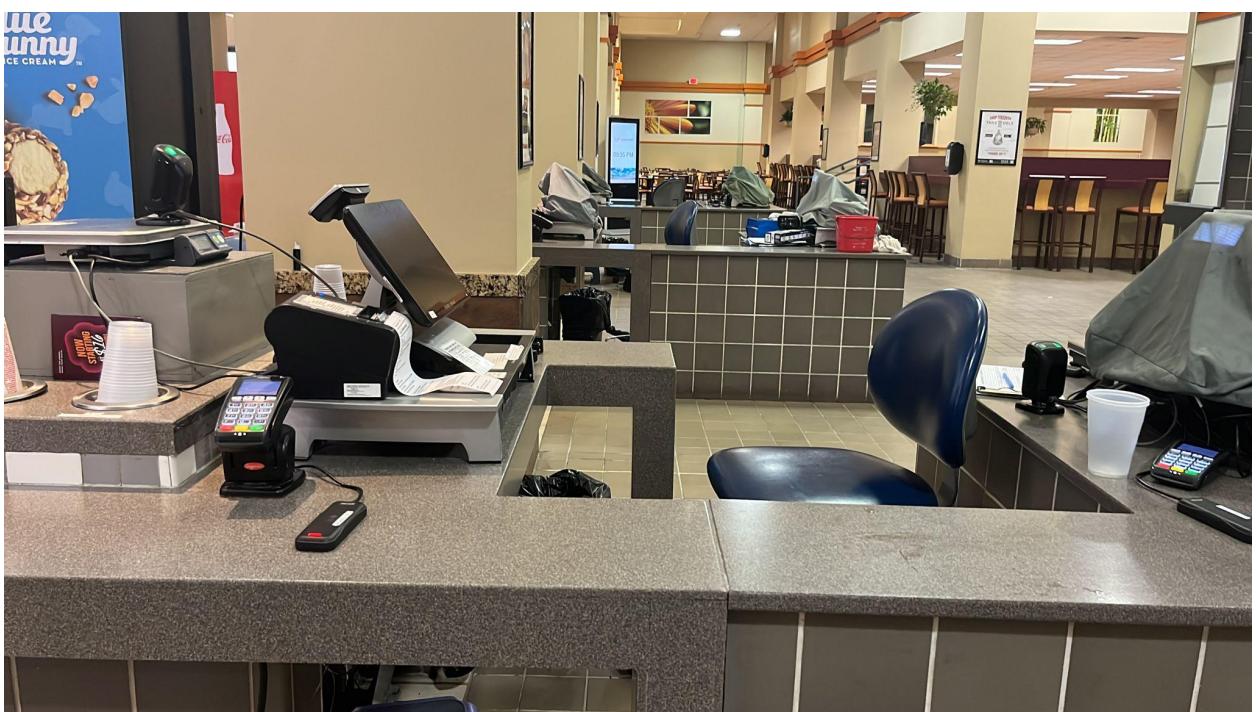


Figure 9: The Food court's Cashier register Side view

10. Field Sketches

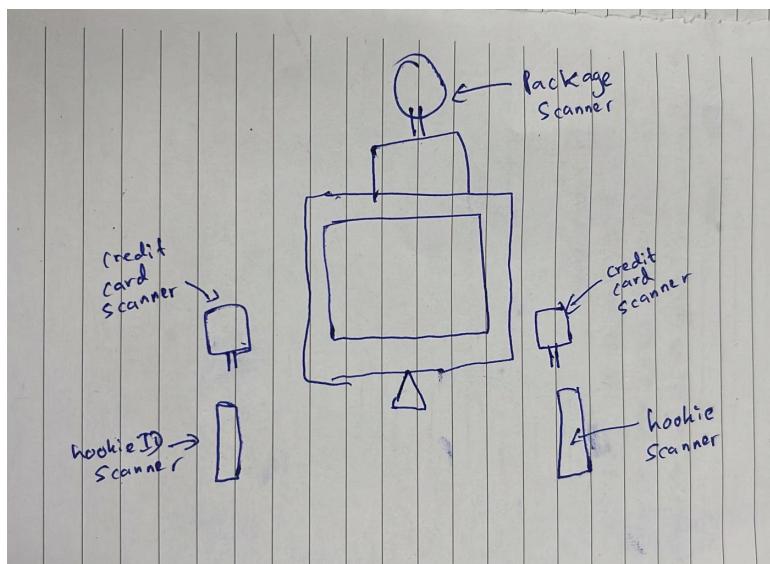
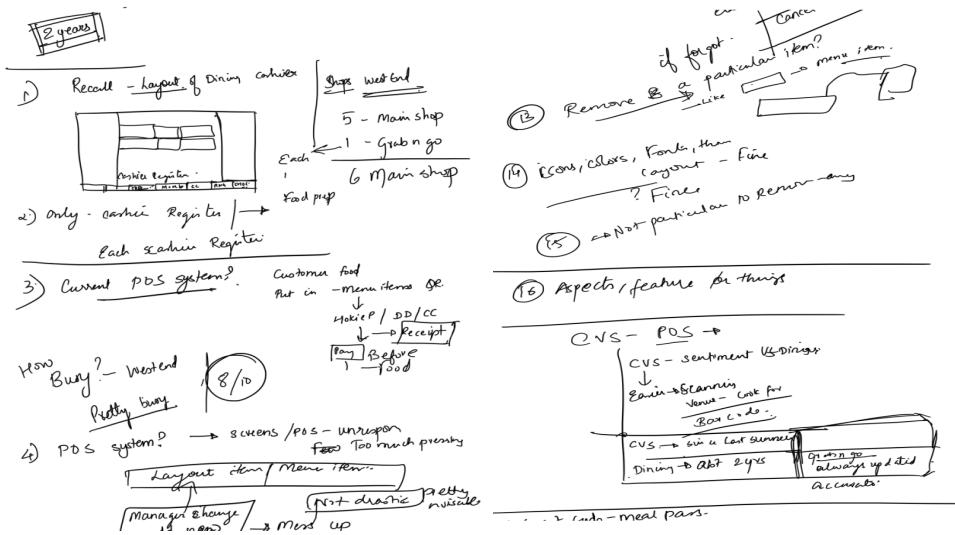


Figure 10: Overview of the Cashier System

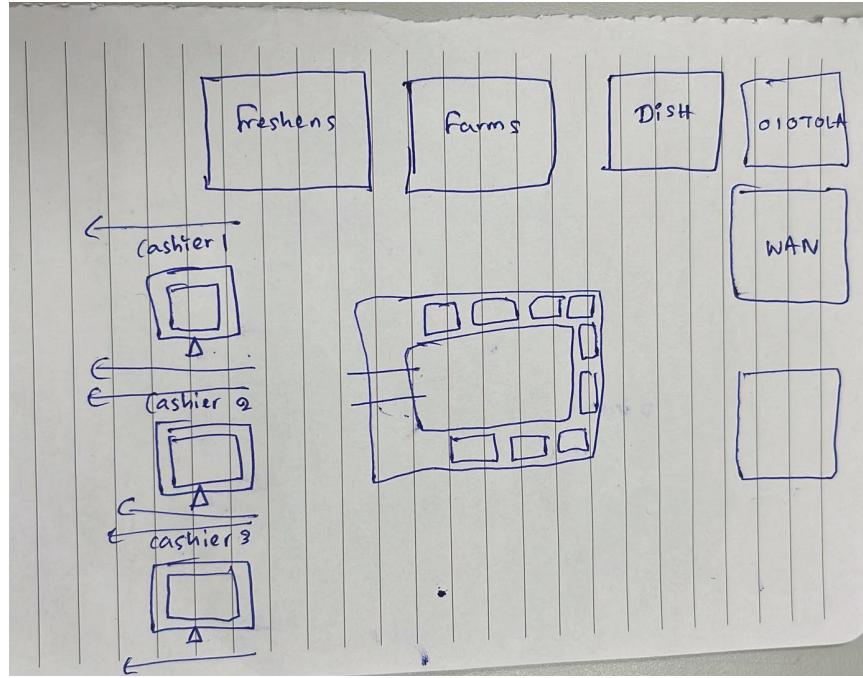


Figure 11: Overview of food court layout

11. Raw Data Notes and Work Activity Notes

Figure 11 shows the raw notes generated from the semi-structured interviews. In total, about 240 word activities (Figure 12) were extracted from the raw notes, which was used to develop the word activity affinity diagram (WAAD) as shown in Figure 15.

- ⑨ Errors — 1 small type
short version voidable have to
manager
- ⑩ Inventory / Available / Unavailable Product Before my shift, I will walk-around.
special item.
- ⑪ Repeating: Holie P - (CS gold - tap) (tap the card) (CS gold - tap) Credit Card — [CC] mPCA.
- ⑫ You get instruction — HP law
OD
Flex plan
- ⑬ Worked D2 - what do do? what do do? pm
- ⑭ Feedback / Intuition Reduce the
Card in to
1 lane Interface modern
- ⑮ Functions to be removed: dining \$ tap hotie p can be used instead
- ⑯ Interface design: Buttons has list inside
and button does not has list, it's difficult
to distinguish. font icons are ok CS
- ⑰ Open ended: price inquiry hard to use
many cashiers don't know about it process of price inquiry: She Never used it.
- ⑱ Receipt → for Credit Card don't mess
- ⑲ Reports: running reports with manager
(problems) helps → how many customers, void, ...

<ul style="list-style-type: none"> → People can go from both sides of the cashier → The package ID Scanner is at the top of the cashier → Cashier can't know if a user has paid on gratuities or not unless the person shows it. → have to first scan the package then the hoodie ID if it's a package food. → If it's an online order you get the bill ack & check the hoodie ID to check if correct name. → If it's a package from shop you ask them what the food is type it on the cashier then the hoodie ID is scanned. (How to know if the person is telling which food correctly? some people open and close some don't.) → Sometimes when students come from both sides of the lane it gets confusing. (better if people can come from one side but the queues will be big then) → Wheelchair person can't access the package scanner. 	<p><u>Cashier</u></p> <table border="1"> <tr> <td>1) Scanned up / NOT</td><td>2) Itemized - Manual</td></tr> <tr> <td>Gratu</td><td>Health</td></tr> <tr> <td>Customer</td><td>Any feature -</td></tr> <tr> <td>Merchant</td><td>① Data security</td></tr> <tr> <td>Discrepancy</td><td>DID Visa/P</td></tr> <tr> <td>Mobile POS</td><td>Payment</td></tr> <tr> <td>With POS</td><td></td></tr> <tr> <td>Don't POS</td><td></td></tr> <tr> <td>Open</td><td></td></tr> <tr> <td>Close</td><td></td></tr> <tr> <td>Function & Report</td><td></td></tr> <tr> <td>Closed chick.</td><td>Print Refund</td></tr> <tr> <td>Card</td><td>Master Card</td></tr> <tr> <td>1-3bb</td><td>① Swipe Refund — via card — via card</td></tr> <tr> <td></td><td></td></tr> </table>	1) Scanned up / NOT	2) Itemized - Manual	Gratu	Health	Customer	Any feature -	Merchant	① Data security	Discrepancy	DID Visa/P	Mobile POS	Payment	With POS		Don't POS		Open		Close		Function & Report		Closed chick.	Print Refund	Card	Master Card	1-3bb	① Swipe Refund — via card — via card			<p>offline - flex. Sale - sv. Down but not shown. Credit card (American Express)</p> <p>Voided Sale</p> <p>POS - Scalable - 9</p> <p>ID2 - System Separation</p> <p>Ideal POS includes?</p> <ol style="list-style-type: none"> ① Ab - Access Layer ② Settings ③ Card (Card)
1) Scanned up / NOT	2) Itemized - Manual																															
Gratu	Health																															
Customer	Any feature -																															
Merchant	① Data security																															
Discrepancy	DID Visa/P																															
Mobile POS	Payment																															
With POS																																
Don't POS																																
Open																																
Close																																
Function & Report																																
Closed chick.	Print Refund																															
Card	Master Card																															
1-3bb	① Swipe Refund — via card — via card																															
<p>PO - Physical POS</p> <p>Ref</p> <p>Card - (key) / System</p> <p>Cashier</p>	<p>→ People can</p> <p>Someone can and said he already paid and only came for a cup no way to find if he was telling the truth.</p>	<p>least important feature/feature</p> <p>Shop</p> <p>↓</p> <p>POS system</p> <p>↓</p> <p>Customer</p> <p>↓</p> <p>Is this clear?</p> <p>offline Transaction</p> <p>Barcode Scanner</p> <p>KPI -</p> <ol style="list-style-type: none"> ① POS - Cashier ② void no. ③ 1POS/Shop <p>Feature for POS Cashier</p> <ol style="list-style-type: none"> ① New Footer Menu 																														

Figure 11: Sample of raw data notes

Buttons that help reduce searching are helpful	No scrolling button, just had to keep tapping	straight forward payment method
unavailable food items are always active	Just tap and make the payment	As a user of POS, I think the "dining \$ tab" should be removed
inquiry needs to be simple	Price inquiry is hard to use and not covered in training	I have never used the inquiry functions

Figure 12: Sample of work activities notes created

12. Building the Work Activity Analysis Diagram (WAAD)

To build the WAAD, we began with an individual exercise in which each member worked on two of the five interviews. This meant that for each interview, we had at least two members working on it. We did this with the hope that having more eyes on the same material would generate different perspectives. This individual exercise primarily involved examining the data we had collected (from notes and interview recordings) and creating work activity notes. Each note needed to be concise, easy to read, and convey only one piece of information. After completing this exercise, we had approximately 240 work activity notes.

To proceed with the next steps in building the WAAD, we held a two-hour group session. We used the Miro website as our workspace to compile our work activity notes and create sticky notes that would be used to construct the WAAD. We initiated this group exercise by reviewing all our notes and then attempting to create clusters based on the written notes. For example, 'Voiding Items' and 'Updating Process' are examples of

clusters we formed. During this step, we had different questions and discussions regarding the clusters, and we tried to reach a consensus as a team. For instance, we discussed whether one cluster was a part of another, and if their notes could be merged, among other topics.

After completing the second step, we revisited the clusters we had created to check for common notes among them that might warrant the creation, removal, or merging of clusters. Moreover, since some clusters had an abundance of notes, we started to create subgroups within clusters as needed. For example, within the 'Updating Process' cluster, we established the following subgroups: 'Entering New Items' and 'Menu Availability and Mismatch.' As a result of these last two steps, we constructed our WAAD, which consists of approximately 20 clusters and 31 subgroups within those clusters. In section 14 of this report, we will show photos of the final WAAD.

13. Photos of Team at Work



Figure 13: Instance of team meeting

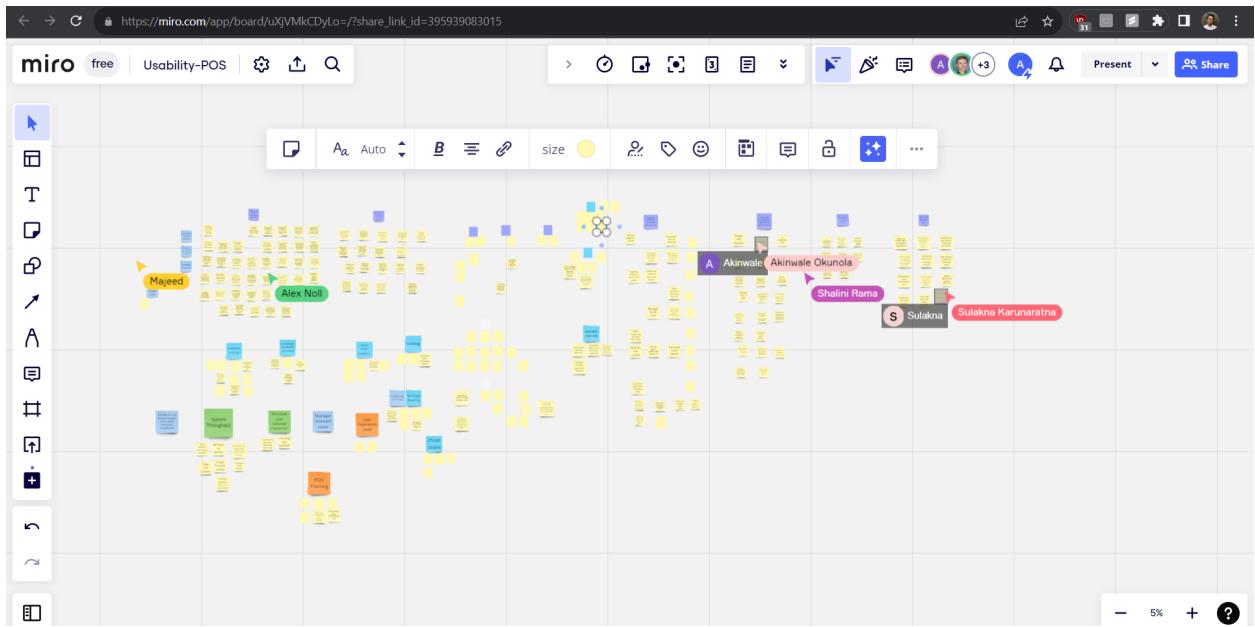


Figure 14: Team working on MIRO for WAAD

https://miro.com/app/board/uXjVMkCDyLo=/?share_link_id=238299354276

14. WAAD Illustrations

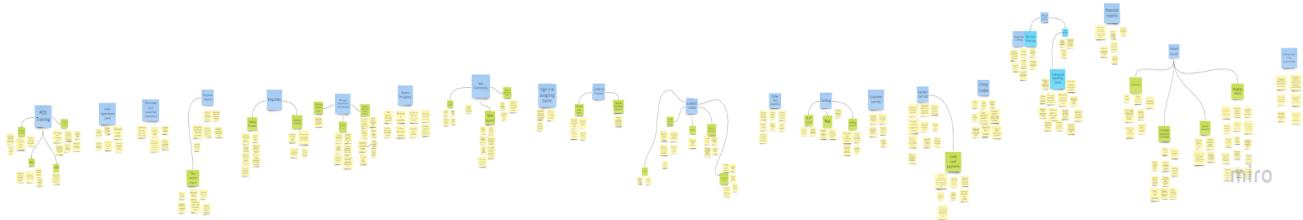


Figure 15: Complete WAAD (Illegible)

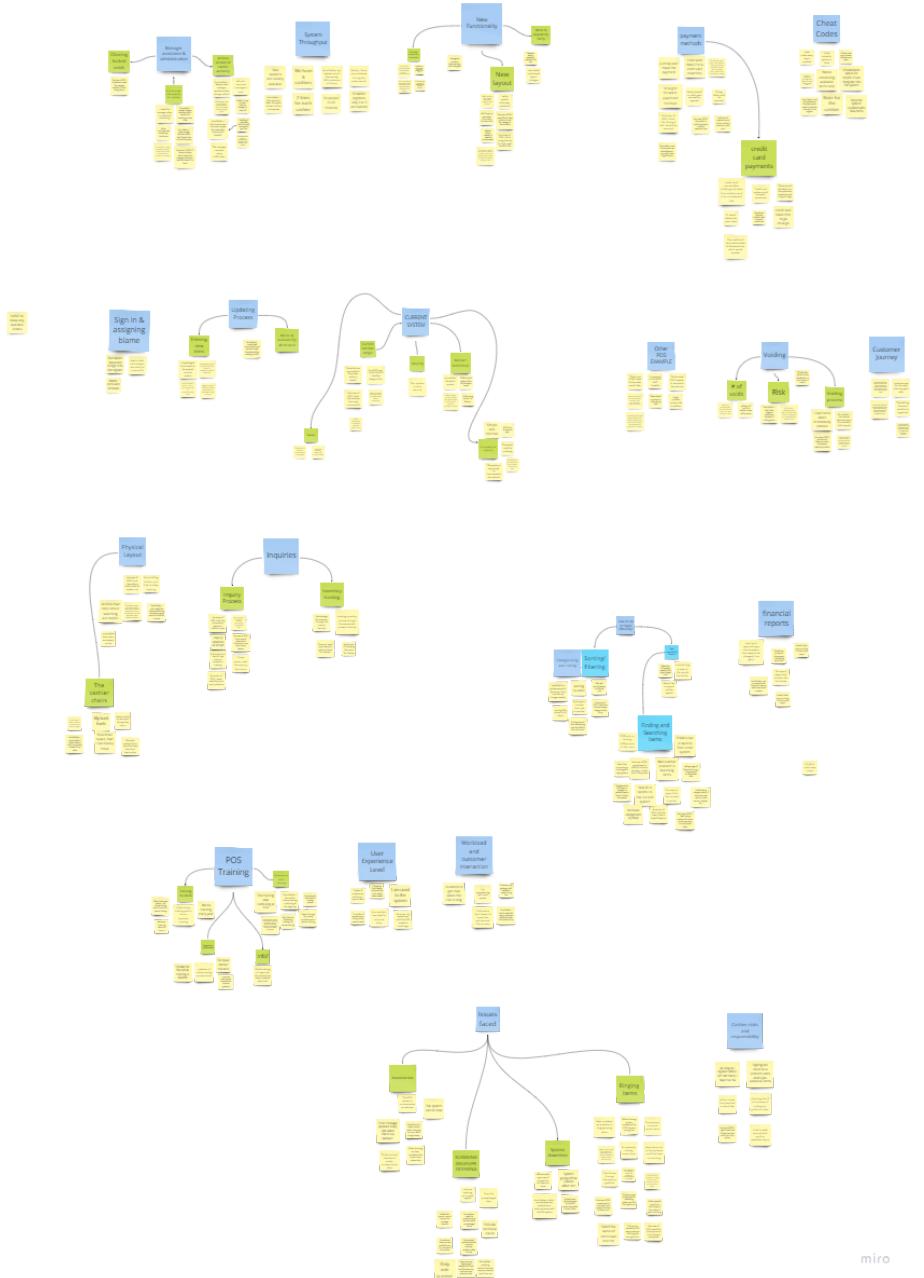


Figure 16: Complete WAAD (Illegible)

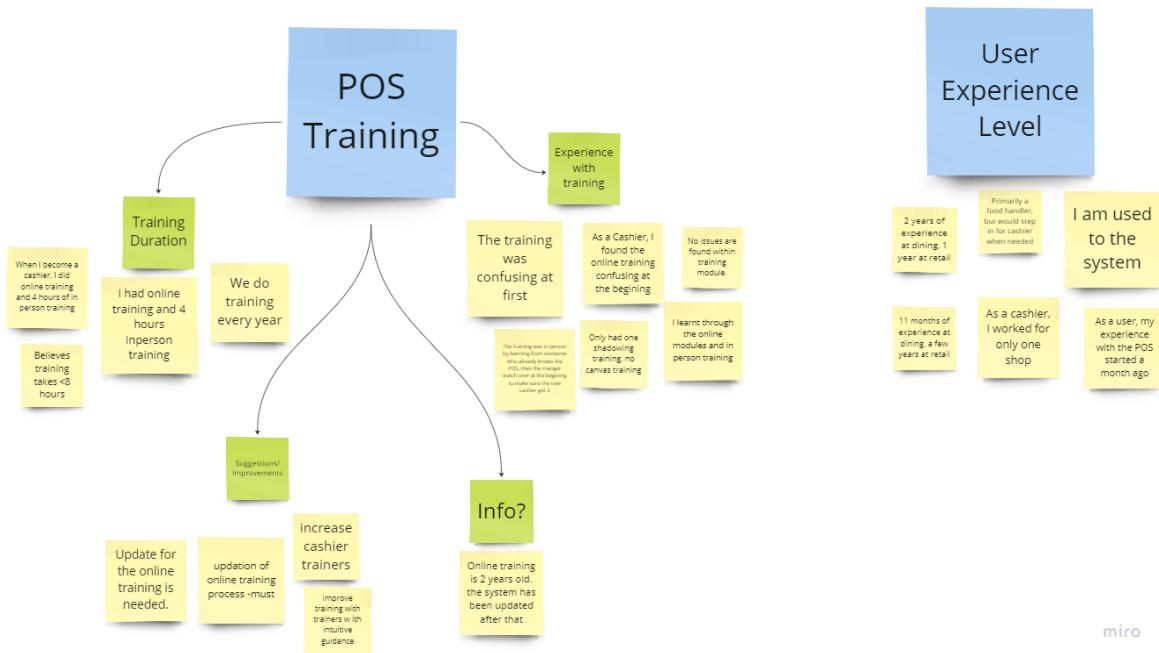


Figure 17: WAAD Partition 1

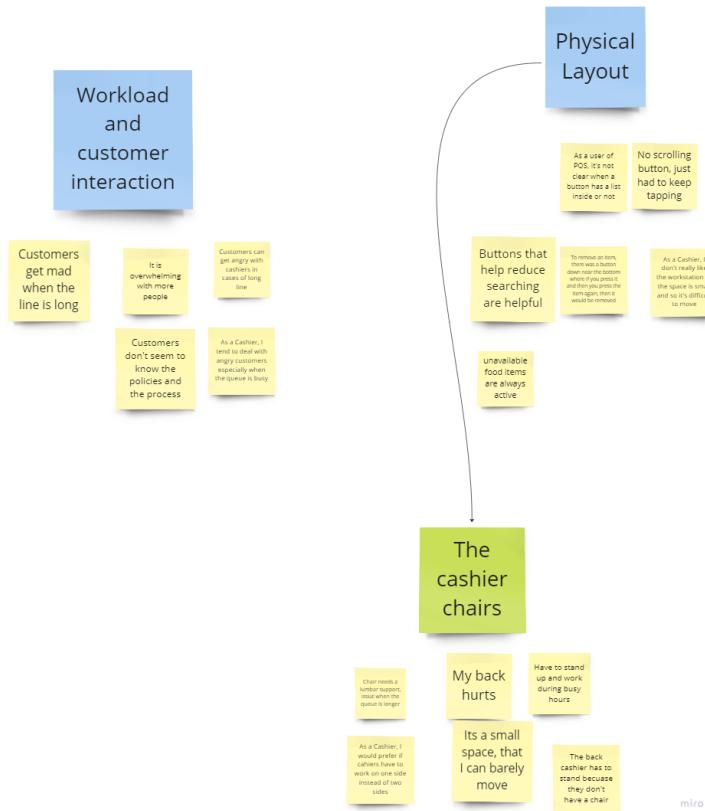


Figure 18: WAAD Partition 2

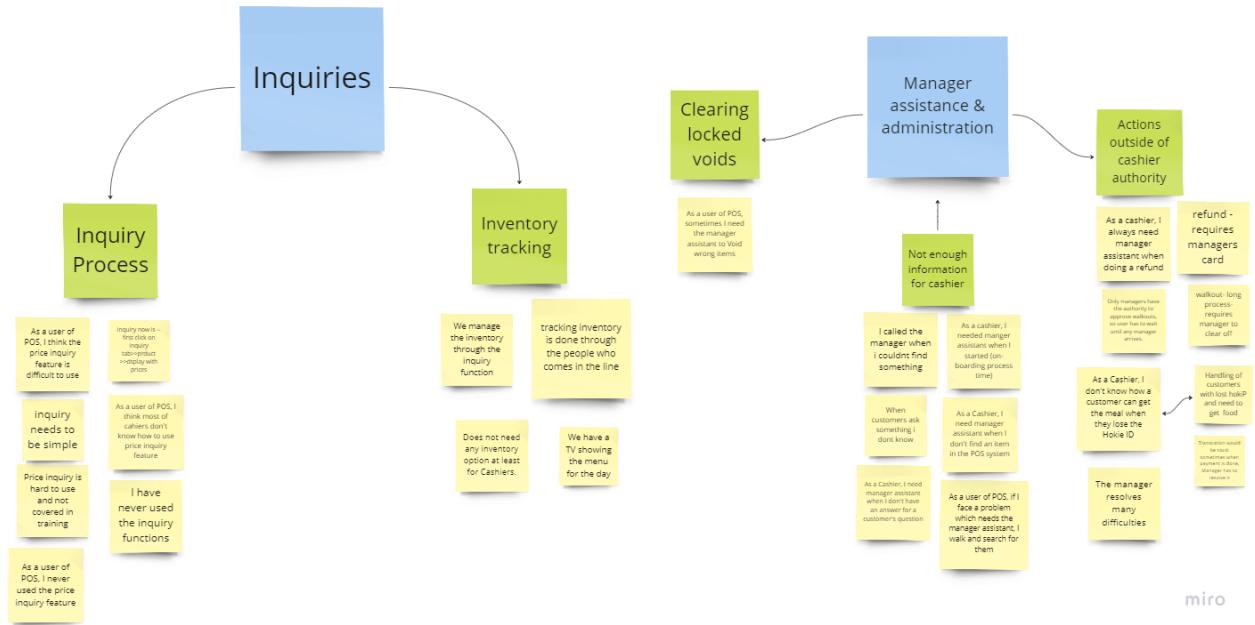


Figure 19: WAAD Partition 3

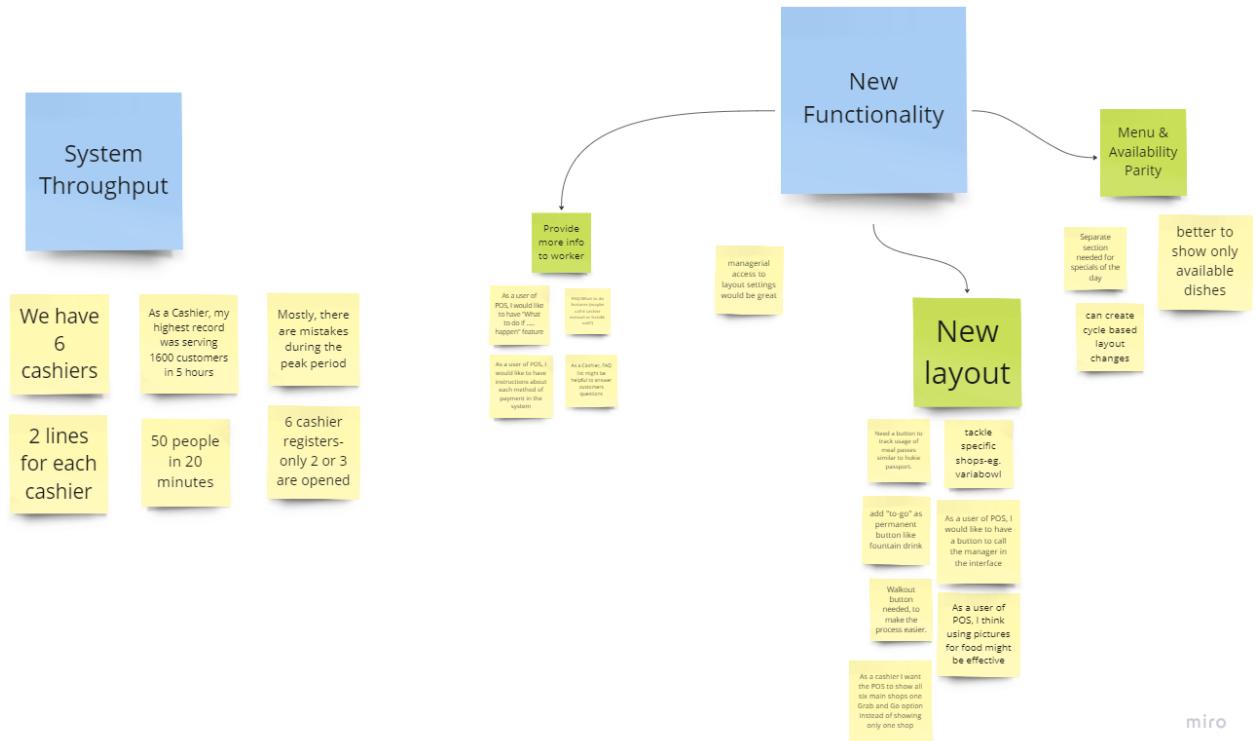


Figure 20: WAAD Partition 4

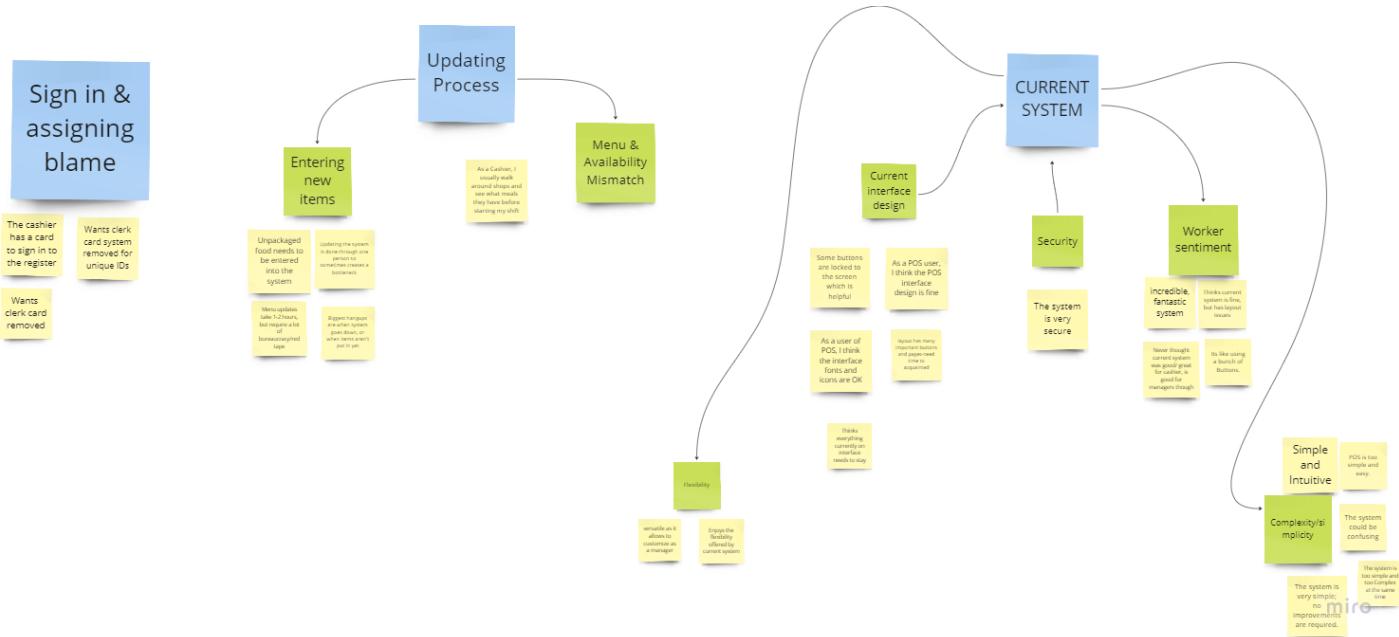


Figure 21: WAAD Partition 5

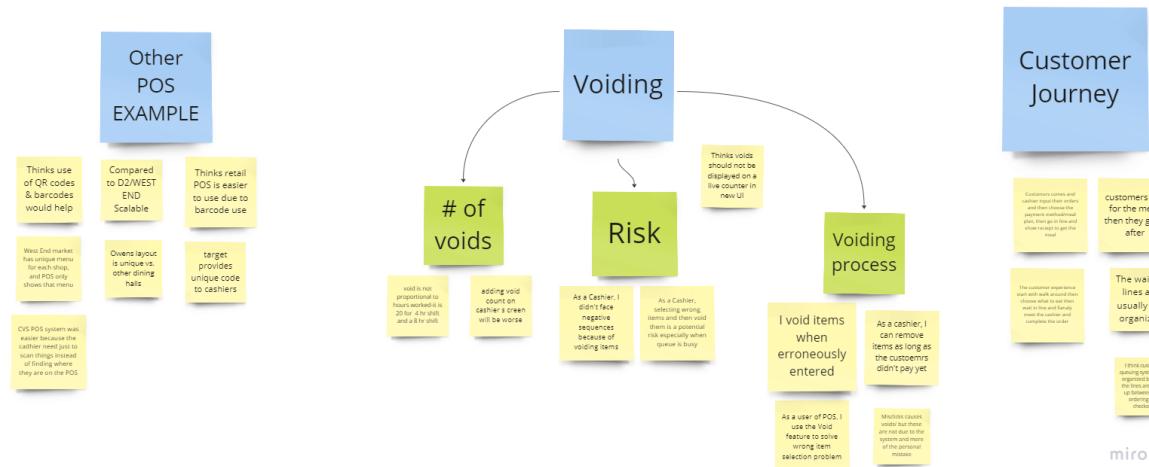


Figure 22: WAAD Partition 6

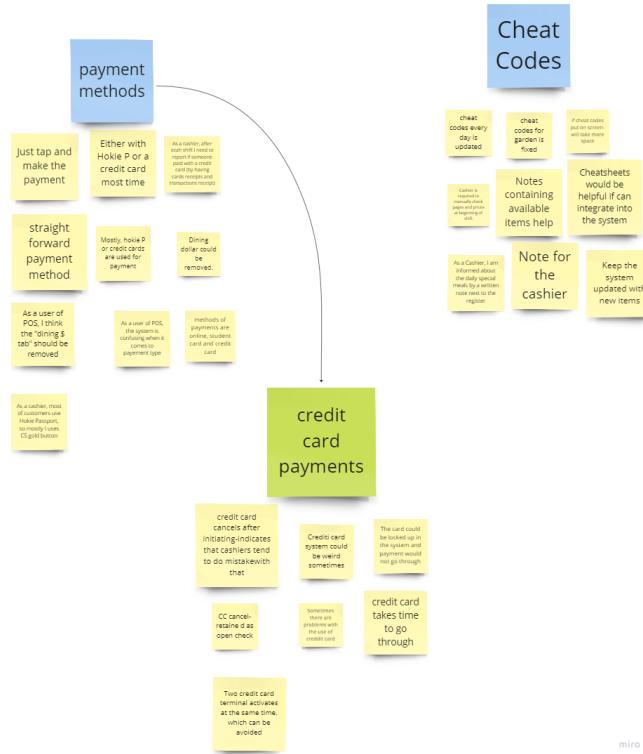


Figure 23: WAAD Partition 7

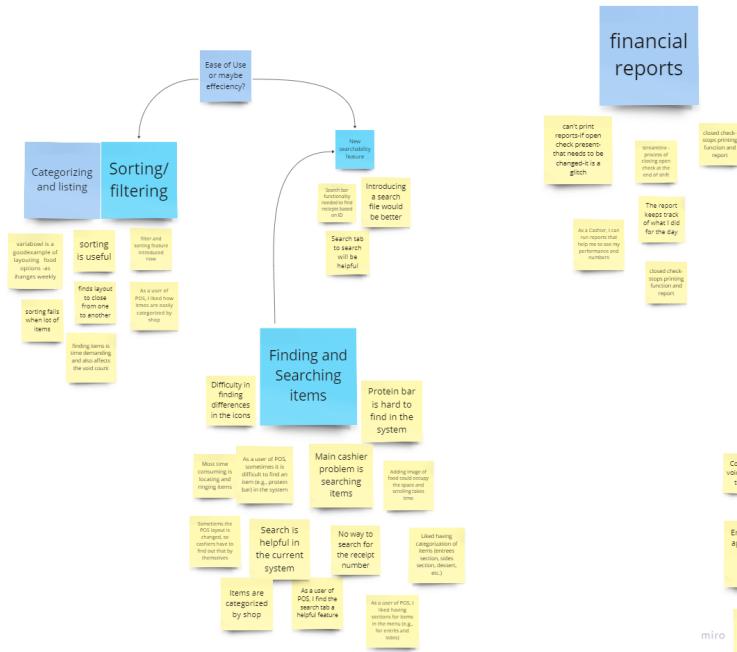


Figure 24: WAAD Partition 8

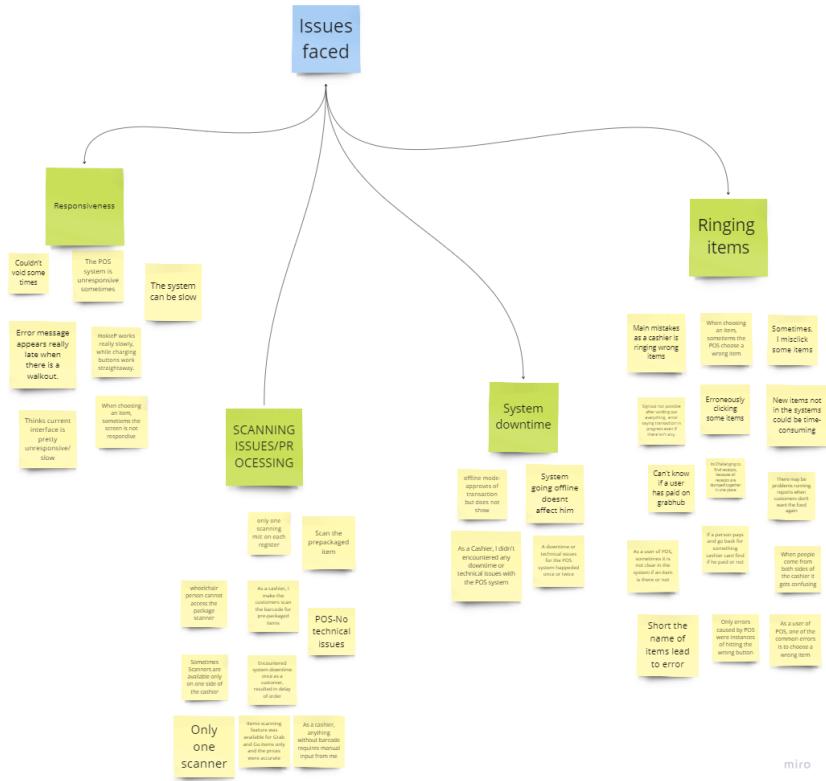


Figure 25: WAAD Partition 9

Cashier risks
and
responsibility



Figure 26: WAAD Partition 10