# I. CSE323 Formative Research (Team KF90)

- Hasung Jun (hasung.jun@stonybroook.edu)
- Dongyeob Lee (dongyeob.lee.1@stonybrook.edu)
- Yujeong Shin (yujeong.shin@stonybrook.edu)
- Kwangmin Kim (kwangmin.kim@stonybrook.edu)

# II. Introduction

People, who do not have laundry in their home, should use public laundry machines. In their point of view, the process of doing laundry is quite onerous work. They collect clothes that need washing, take detergent and fabric softener, and head toward the laundromat. Unless users go to a laundromat physically, they do not know the availability of machines. Especially during a change of seasons requiring bed-washing, laundromats are more crowded than usual. The users are easily frustrated by waiting for a long time whenever all the laundry machines are full.

The primary users are single-household who frequently use a laundromat, IGC students, and laundromat owners who want to give out useful information to users. Our designed software will solve the problem which laundromat users often encounter as we mentioned in the previous paragraph. The result of the survey attests to the importance of the above-mentioned issues because most users repeatedly mentioned the same problem that always wished for the solution.

We will build software that notifies the current status and remaining time of laundry machines to users with additional features. The software will enhance people's quality of life by reducing the inconvenience of wasting time or waiting in line. The goal for this project is to universalize this software in every laundromat in South Korea so that wherever and whoever wants to use the laundromat, they can easily access the software to check the nearby laundromat's laundry machines operation status.

This project will be unique compared to existing solutions. It will be user-friendly and user-centered software by openly getting feedback from tentative users. The feedback will be analyzed to find out the user's most wanted features and what features must be improved. Most importantly, it will have features that no other applications supported before. For example, in IGC laundry rooms, many students respond that there are frequent laundry thieves. To solve such a problem, stealing alarms will be applied so that when a person other than a laundry owner tries to open the door, the alarm goes on to the owner.

# III. Background

The problem had arisen since laundromats became popular in South Korea. People had to wait in line especially when laundromats are more crowded than usual such as during the rainy season. In the IGC dorm, especially during the weekend, due to a shortage of dryer machines, students are waiting in front of the dryer to put their laundry first (8 washers and 4 dryers in each dorm). Additionally, a lot of comments are posted on the IGC Facebook page that some of their laundries are missing. The problem is constantly arising in the IGC Facebook page or Kakaotalk group chat.

*Figure 1: Waiting in line during rainy season*

Current existing solutions to the problem are laundry-coffee shops, an application called "CLOS", a website called "Laundryview", and location of a laundromat. Laundry-coffee shops, which means integrating cafes and laundromats,which rarely exist. It can be a solution if the machines are full and have to wait. The purpose of our solution is to let users not to wait while the purpose of the laundry cafe is providing a waiting place to users. The main features of CLOS are checking the availability of laundry machines and charging money via an application that is similar to our designed software. However, more features will be added in our software such as stealing alarm and showing a list of places categorized by a cafe, entertainment or restaurant nearby laundromat that customers can wait. Moreover, this application is only available for certain laundromats who have a contract with the company with monthly payment. Therefore, it has a lack of interoperability for users, meaning that there is a possibility that users cannot use the same application in different laundromats.

LaundryView is a web-based platform tracking laundry machine's operation in universities located in the United States. When a user enters his or her university in the search bar, it shows whether laundry machines in their campus are available or not, in 3D animation. LaundryView and our project will have the same features such as the remaining time and availability of laundry machines, but our project will focus on both the laundromat located outside of campus as well as the IGC laundry room. Sometimes a laundromat is located in a multi-complex where other entertainments, such as arcade or coin karaoke. Our project will show the list of places to stay nearby the laundromat for users to wait or spend time.
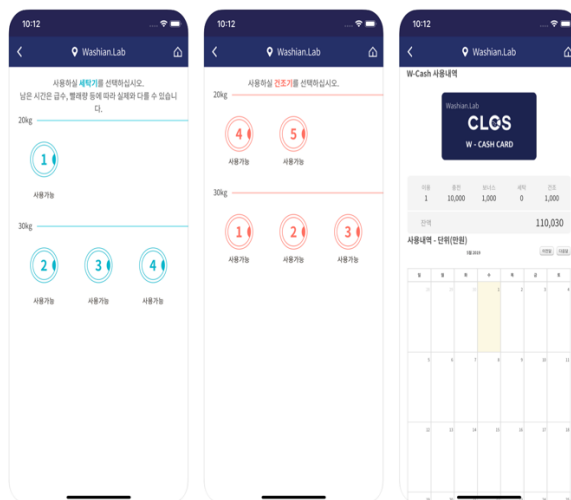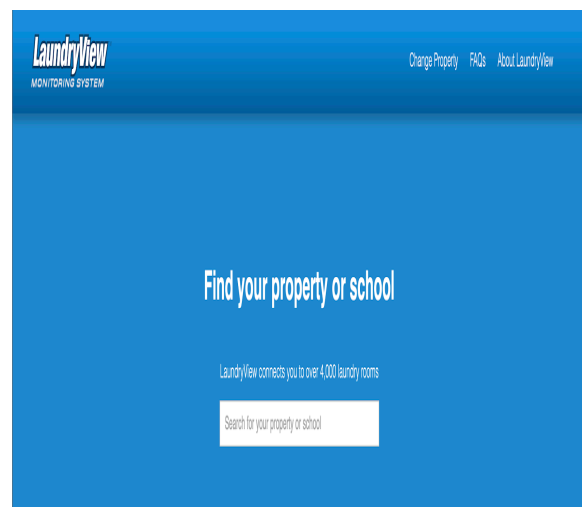


*Figure 2. CLOS*　　　　　　　　　　*Figure 3. LaundryView Website*

# IV. Target Users

We have two primary target users; they are single householders who use laundromat and laundromat owners. For laundromat users, our software's features will provide a more convenient experience of doing laundry. By showing the status of machines, users can decide whether they should go or wait to do the laundry. Also, by showing the remaining time of laundry and notifying users when the laundry is finished, users can efficiently use their time. For laundromat owners, they can attract more users by utilizing our software. If users find out the convenience of our software, more users will come and take advantage of it.

# V. Formative User Research

For recognizing main needs and inconvenience from the laundromat users, we completed three pre-inspections by using surveys, interviews, and observation. First, we collected surveys from acquaintances who are single householders using the laundromat often as well as IGC students who also use washing machines in dorms. Second, we did interviews with laundromat owners to find out reality more in detail. Finally, we visited laundromats nearby the school and dorm laundromats to observe customer's behavior and find a better solution.

## 1. Survey

We collected participants by utilizing personal connections and a school group chat room. Students in campus are selected as participants because most of them are the laundromat users in the dorm and often undergo the inconvenience by using it. Also, we went to nearby laundromats and discovered a few users who kindly participated in our survey.

We made a google form to ask several questionnaires about the laundromat and it automatically collected data. Group members discussed all together to analyze the result.

As we anticipated before designing this software about the laundromat, we could see that many people had trouble waiting for a long time because laundry machines were full as shown in Figure 6. Also, we could see the demand for the need of a software that notifies the end of laundry to users in Figure 9. More than fifty percent of people who have experience of using a laundry machine had to wait for other people to finish their laundry. Over ninety percent of users have agreed to the suggestion that they would like to use the software if it is available. We suggest that users also went through difficult times because they were not fully aware of the remaining time of machines or waiting lines.Following are valuable answers from question 6, which asks to write down the list of their complaints or suggestions for the improvement of laundromat.

- I hope that we can see how much of the laundromat is being used.
- Alerting system whether the laundry machine finishes or not.
- I was uncomfortable when I had to wait at the laundry machine because of the presence of laundry in the laundry machine even when the laundry was finished.

## 2. Interview

We interviewed four people: two laundromat owners and two users. We visited nearby laundromats to recruit owners whom we can interview. For users, we asked a friend who lives on the campus and a mother of one of the group members who use laundromat frequently. The laundromat owner 1 was a woman with the age around 50. Owner 2 was a man with the age around 60. User 1 was at the age of 60. User 2 was a man in the age of late 20.

First, We prepared the interview questions by working on google docs together. Then, we split into two teams to locate and contact laundromats. Among them, two owners approved to have an interview with, so we set the date and time to meet them. For users, we utilized phone calls to interview them. We wrote down the conversation and discussed it as a group to analyze the result.

As a result, we could derive that owners and users were both feeling the need to improve the laundromat system. For Owner 1 who was already using the CLOS application, she gave another tip that could be a new feature, such as interlocking credits over all the laundromats. User 1 mentioned her personal incident that we did not expect as difficulties. She said, "During the rainy season, I went to the laundromat that had 3 washing machines and 3 dryers, I had to wait more than an hour because one person from Jjmjilbang (Sauna) used all the machines and next person from a beauty salon also used all the machines". We realized that customers do not have to be an individual who lives alone, but it also can be the owner of a different store who has much more laundries. She suggested that it would be helpful if there was a special time slot for those kinds of people. Additionally, she mentioned that laundromats are constantly evolving. When she first visited the laundromat, the method of payment to use the machines was to insert coins. However, now credit card is also available for payment. Some laundromat like owner 1's, they use an application like CLOS. The problem is that the young generation has no problem adapting to a new system while the old generation takes more time to adapt to a new system and even they do not even want to try. By looking at users' responses, we could see that they had problems that we expected as well as we did not expect.

# VI. Conclusion

From our survey that was conducted by 73 people, we concluded that over fifty percent of users have experienced some difficulties while using laundry machines because of the remaining time of either other people or other finished laundries. Also, we found that the application "CLOS (Common Laundromat OS)" already exists through an interview with a laundromat owner. "CLOS" is quite similar to what we want to develop. We would like to expand it by adding more features from CLOS to make it more user friendly. We would keep it simple but contains concrete features for users to help in the range of 10 to 70, in terms of age.

The functions to be added are stealing alarm and the introduction of entertainment nearby. Since we cannot overlook the protection of users' laundry as a result of survey shows, we have to be careful to deal with laundries by setting a stealing alarm to fully protect users' laundry. Moreover, it is important to keep users' time efficiently and to do that, we would like to introduce some places that can entertain customers to spend and come back rather than just sit down. Fundamentally, we will establish the software that alerts a remaining time of laundry machines and current status by adding features we found. Our ubiquitous application would be directly user-oriented and improve people's quality of life.

# VII. Reference

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CANOFIX. (2013, July 19). Retrieved March 26, 2020, from
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Laundry Project, Collaboration with Cafe and Laundromat. (2015, March 17), from
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LaundryView. (n.d.). Retrieved from https://www.laundryview.com/home/2376/88000538/CHAPIN-APARTMENTS/BLDG-B

# VIII. Appendix

Observation in Campus:

| Time/Friday | People Visited | People who Waited | People who didn't bring their clothes on time(in 10mins) |
|---|---|---|---|
| 08:00-09:00 | 0 | 0 | 0 |
| 09:00-10:00 | 2 | 0 | 1 |
| 10:00-11:00 | 1 | 0 | 0 |
| 18:00-19:00 | 0 | 0 | 0 |
| 19:00-20:00 | 2 | 0 | 2 |
| 20:00-21:00 | 4 | 2 | 2 |
| 21:00-22:00 | 7 | 3 | 3 |
| 22:00-23:00 | 3 | 1 | 1 |

Our team previously had interview questions as to ask complaints and feedback from the users and also a question about availability of laundry machines. We, however, got feedback to ask users' common complaints. Furthermore, it is also positive thinking to ask if users care the availability of machines.

**Survey Questions & Responses**

1. How often do you use laundromat?
2. Where do you stay or go after you put your laundry in the laundry machine?
3. Have you waited or left because laundry machines were full?
3-1. If you have, how often does it occur?
4. Have you ever waited for a machine because of the presence of laundry in the laundry machine even when the laundry was finished?
5. Have you picked up your laundry late because you forgot the end time of the operation?
6. Please feel free to list your complaints or suggestions on improvement when you use the laundromat.
7. Would it be helpful If you have an application to show the number of available laundry machines?
8. Would it be helpful If you have an application to show the remaining time of laundry machines?

We got responses from 73 users and the results are as follows.

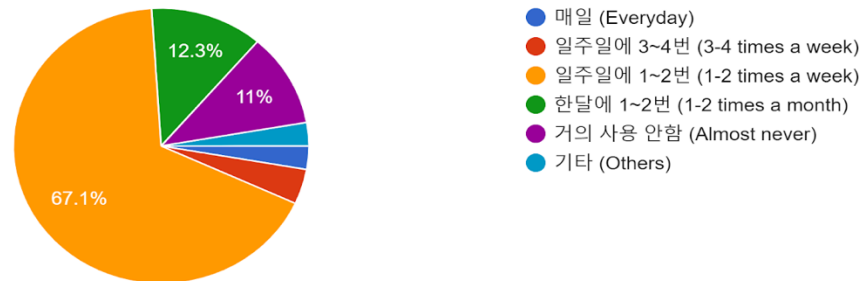1) 얼마나 자주 빨래방을 이용하시나요? (How often do you use laundromat?)
73 responses



- 매일 (Everyday)
- 일주일에 3~4번 (3-4 times a week)
- 일주일에 1~2번 (1-2 times a week)
- 한달에 1~2번 (1-2 times a month)
- 거의 사용 안함 (Almost never)
- 기타 (Others)

*Figure 4. Survey question #1*

2) 세탁기에 세탁물을 넣고 나서 기다리시는 동안 어디에 계시나요? (Where do you stay or go after you put your laundry in the laundry machine?)
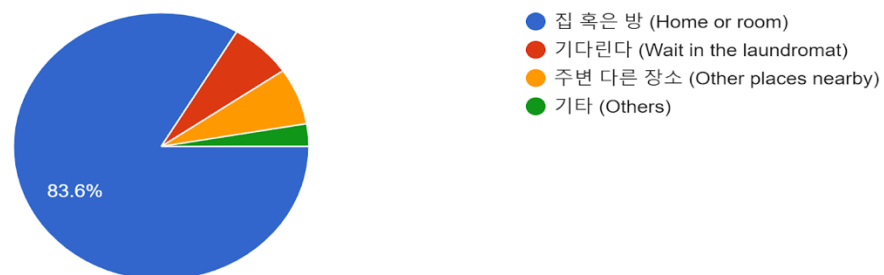73 responses



- 집 혹은 방 (Home or room)
- 기다린다 (Wait in the laundromat)
- 주변 다른 장소 (Other places nearby)
- 기타 (Others)

*Figure 5. Survey question #2*

3) 사용 가능한 세탁기가 없어서 기다리거나 돌아간 적이 있나요? (Have you waited or left because laundry machines were full?)
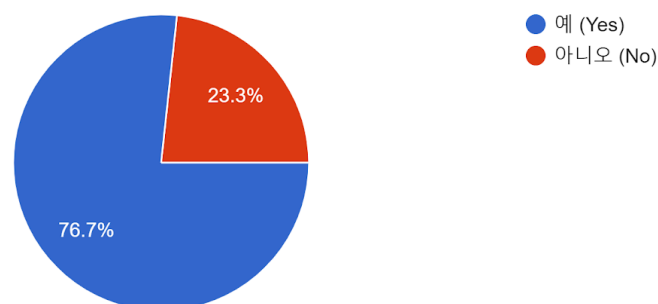73 responses



- 예 (Yes)
- 아니오 (No)

*Figure 6. Survey question #3*

3-1) 만약 기다리거나 돌아간 적이 있다면, 얼마나 자주 겪나요? (If you have, how often does it occur?)

56 responses



- 항상 (Every time)
- 두번에 한번 (50%)
- 세번에 한번 (33%)
- 네번에 한번 (25%)
- 기타 (Others)
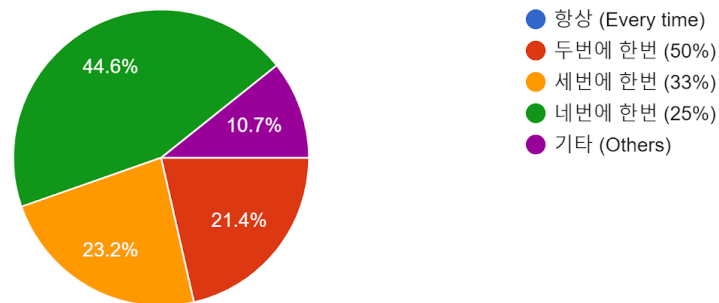
44.6%
10.7%
23.2%
21.4%

*Figure 7. Survey question #3-1*

4) 종료된 세탁기 안에 세탁물이 존재하여 세탁기를 사용하지 못하고 기다린 경험이 있나요? (Have you ever waited for a machine because of the pre...dry machine even when the laundry was finished?)
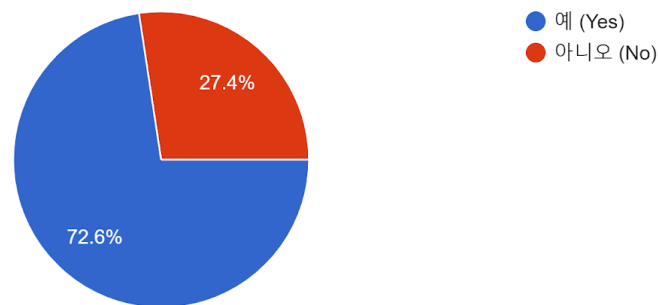
73 responses



- 예 (Yes)
- 아니오 (No)

27.4%
72.6%

*Figure 8. Survey question #4*

5) 세탁 종료 시간을 잊어서 세탁물을 늦게 수거한 경험이 있나요? (Have you picked up your laundry late because you forgot the end time of the operation?)

73 responses



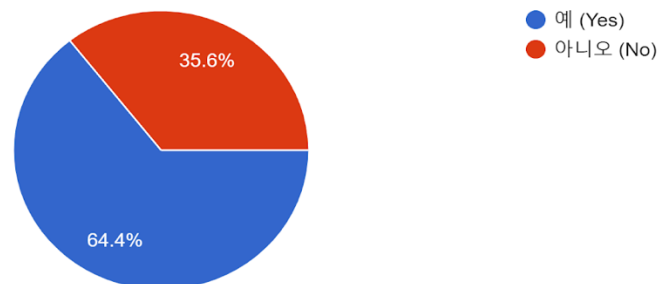- 예 (Yes)
- 아니오 (No)

35.6%
64.4%

*Figure 9. Survey question #5*

7) 사용 가능한 세탁기를 볼 수 있는 애플리케이션이 있다면 도움이 될까요? (Would it be helpful If you have an application to show the number of available laundry machines?)
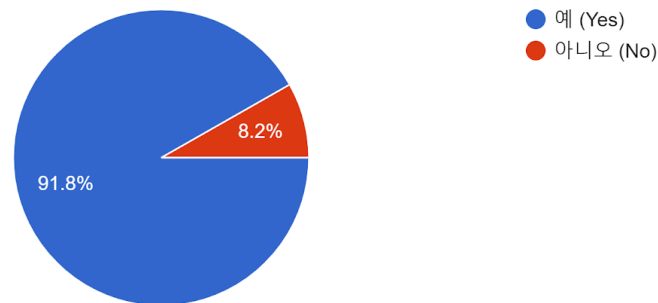73 responses



*Figure 10. Survey question #7*

8) 세탁기의 남아 있는 시간을 볼 수 있는 애플리케이션이 있다면 도움이 될까요? (Would it be helpful If you have an application to show the remaining time of laundry machines?)
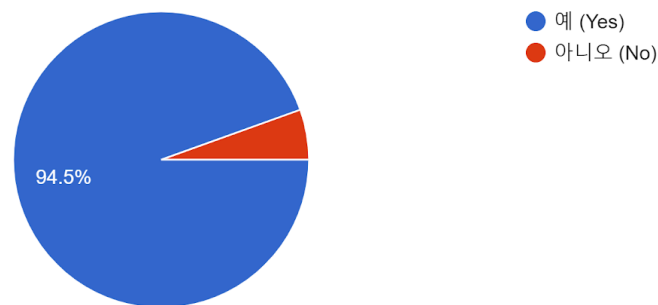73 responses



*Figure 11. Survey question #8*

**Interview Questions & Responses**

**Owner 1 (Machine-centered)**
1. How many customers on average use this place during weekdays and weekends?
   - Haven't counted them.

2. When do you think is the most popular time users come in?
   → Follow up questions: which day is popular or which season is popular?
   - Mostly in the morning and afternoon. Not at noon.
   - Friday, Saturday, Sunday, Monday.

3. Have you ever received feedback or complaints from customers? (general difficulties)

- Hasn't gotten any feedback or complaints from customers, but I saw a comment in the app that I use to run the laundromat that tells the customer is going to move in to another place and wanted to get a refund. It would be better if more laundromats use the same application so that customers can use their money in the app wherever they go.

4. Would you be willing to use our system when it is developed? (ask there is problem first, if yes and if no parts)
   - Already has the app.

5. In the perspective of you as an owner, what would be some major complaints or issues from customers?
   - Waiting. Most customers do not wait until the laundry is finished so they go out to get a coffee or walk or go to the room. Most customers use the washing machine then they move their clothes in the dryer. Washing machine takes 30 mins and it is an ambiguous time to do something. They have to come back after 30 mins and move their clothes to the dryer which is the most frustrating thing for customers. Also, young generations are good with handling applications, but sometimes, customers with older generations are having harder time with handling applications.

6. What was the most annoying moment when you dealt with customers?
   - Not yet experienced.

7. What are some difficulties while you run this place and why?
   - Not really. I like to talk with people.

**Owner 2 (Owner-centered, meaning that there are not many laundromat)**
1. How many customers on average use this place during weekdays and weekends?
   - Most customers come in the afternoon or on the weekend.

2. When do you think is the most popular time users come in?
   - The most busy time for him is after 6:00PM or during the weekend.

3. Have you ever received feedback or complaints from customers?
   - Since this is an owner-centered laundromat, I have more interaction with customers. Most of the complaints are not related to the self-laundry machine.

4. Would you be willing to use our system when it is developed?
   - Yes. It is better for me to give good service to customers.

5. In the perspective of you as an owner, what would be some major complaints or issues from customers?
   - During the weekend or when it rains, many people come to laundromat to wash and dry. I believe that having more laundry machines and dryers are better for customers.

6. What was the most annoying moment when you dealt with customers?
   - Even though he did his best to clean the shoes or clothes, sometimes it is almost impossible to remove stains. However, customers are complaining why the stain still remained.

7. What are some difficulties while you run this place and why?
   - Not really.

**User 1**
1. What is the reason you come to laundromat?
   - Weather, when it is cloudy or rainy, clothes don't dry.
   - When there is a lot of laundry. Or when she wants to wash a blanket or carpet.

2. How often do you use laundromat?
   - Depends, usually during the summer when it's the rainy season.
   - Usually once a month or two months.

3. What is your complaint or difficulty of the laundromat?
   - Laundromat evolves. They constantly bring new systems. For example, it accepted only a coin, but one day it was available to pay with a card. It is a good thing, but sometimes it is hard to adapt to a new system.
   - Sometimes, she has to wait. Sometimes, one customer brings a lot of laundry and uses all the laundry machines. Once, the owner of Jimjilbang and a beauty salon came to the laundromat and used all the space. The other customers had to wait until they were finished.

4. How do you deal with the problem? If you can't, why?
   - When the laundry is full, she has to wait. Nothing she can do.
   - She has to adapt to a new system.

5. Have you lost your clothings or heard from others that they lost it?
   - No.

6. What would be a great solution for those problems?
   - Reservation system would be helpful. Or a special time slot for a customer who has to do a large capacity of laundry.

7. Will you be willing to use this system when it is built?
   - Yes.

**User 2**
1. What is the reason you come to laundromat?
   - He does not have a personal laundry machine, so he has to use the school's laundry machine.

2. How often do you use laundromat?
   - Twice or three times a week.

3. What is your complaint or difficulty of the laundromat?
   - Each dorm has 8 washing machines whereas there are only 4 dryers.
   - Therefore, sometimes it is no problem to wash the laundry, but he has to wait with wet laundry because dryers are full.

4. How do you deal with the problem? If you can't, why?
   - Since he has to wait when he does his laundry during the weekend, he tries to do his laundry when not many people are using laundry machines such as in the morning or weekdays instead of weekends.

5. Have you lost your clothings or heard from others that they lost it?
   - Yes, he heard many people lost their laundry. He personally lost his socks, towel, and underwear.

6. What would be a great solution for those problems?
   - If people are on their time when the laundry is done, they have to come right away. I believe clothes are missing because people take our other people's laundry because it is done and when they move other people's laundry, it may drop on the floor or drop in the back to the laundry machine.

7. Will you be willing to use this system when it is built?
   - Absolutely.