

Design Aesthetics Methods: Chinese Graduate Students Using Laundry Bags in the UK as an Example

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To cite this article:

Bi Li, Yushu Dong, Siyuan Lai. Design Aesthetics Methods: Chinese Graduate Students Using Laundry Bags in the UK as an Example. *International Journal of Education, Culture and Society*. Vol. 8, No. 3, 2023, pp. 133-143. doi: 10.11648/j.ijecs.20230803.17

Received: April 13, 2023; **Accepted:** May 22, 2023; **Published:** May 29, 2023

Abstract: Proficiency in the application of design research methods is a basic competency that student researchers need to master. During the learning phase, experienced researchers demonstrate various design research methods for student designers to understand and practice. At present, there are a large number of literatures and books that introduce the definition of different design research methods and give relevant practical examples. Moreover, student researchers still have confusion about the process of the research method in the early design, and lack a complete understanding of design research thinking and processes. This article will take the topic of sustainable laundry as an example, based on the core research theme of the impact of the use of laundry bags on environmental sustainability by Chinese graduate students studying in the UK in their daily lives, and demonstrate the complete design research ideas and process from 6 modules. This design form emphasizes authenticity, interactivity, and humanization. In terms of authenticity, experiential design strives to create a scenario as realistic as possible, constructed with as real questions and materials as possible, to maximize the satisfaction of users' real needs. In terms of interactivity, experiential design adheres to the standard of users' spiritual enjoyment and physical pleasure, strengthening interaction with users. In terms of humanization, experiential design focuses more on the fun of furniture products, emphasizes meeting the deep spiritual and cultural needs of users, and endows furniture products with more functional value in a form that is more in line with the human body structure, thus integrating with users.

Keywords: Design Aesthetics Methods, Education, Sustainable Laundry

1. Introduction

In the past time, the UX design industry has begun to be concerned and applied by various industries, which has led to increasing demand for qualified UX designers [5]. He found that courses and degrees related to interaction design have also received continuous attention and pursuit. [4] Proficiency in the application of design research methods is one of the competencies that student designers need to master, and has also received educational and industry attention. Löwgren and Stolterman state that systematic and structured design methods are beneficial in that they can help designers to be rescued from difficulties. [9] Additionally, they also encourage designers to use methods as the main learning tool, which can help designers improve their capabilities to varying degrees. However, Gray

found that junior designers face some confusion when applying traditional design methods, and cannot truly connect education and industry. Therefore, this article takes sustainable laundry as the topic, using the UXSD (user experience and service design) module coursework from Loughborough University as an example. It demonstrates the complete thought and planning of a design using research methods. It is worth noting that it will introduce the steps of practice and the challenges that may be encountered, to support the reference of student designers to conduct relevant research.

2. Design Research Method Cases

2.1. Insight from Secondary Research

Themes related to “laundry and sustainability” are found in

secondary research. According to scholars Martin and Hanington, [10] books and journal articles are one of sources of secondary research. This means that it may be necessary to read resources related to laundry and sustainability. Reducing microplastic pollution was discovered to be a relatively recent topic while reading the articles. Moreover, the reading materials were divided into three main areas for information gathering: background, interventions, and intervention evaluation.

Research by Kärkkäinen and Sillanpää shows, in the past, microplastics have been closely related to human life, however, substances smaller than 5 mm in size have attracted everyone's attention. [7] This is due to the possibility that these microscopic particles will harm aquatic ecosystems. Some researchers hold the belief that micro plastics released from clothing during the washing process are a major source of micro plastics that pollute water and oceans. [8] Moreover, Browne et al., conducted a study of household washing machine wastewater, and they found >1900 fibers per garment in a single wash. [2] Similar findings were made by Kärkkäinen and Sillanpää, [7] who found that household washing machines emit 150,000 kg of polyester fibers per year. As a result, it has become very urgent to encourage people to pay attention to and reduce micro plastic activities.

In a recent Kärkkäinen's study, they mentioned that several measures may reduce the release of micro plastics during the washing process, including (1) installation of LUV-R filters in household washing machines (2) two commercial fiber: Cora Ball and washing bag (Guppy friend). Additionally, they claim that during the washing process, the laundry bag (Guppy friend) and Cora ball can reduce polyester fibers by 39% and 10%, respectively. Consequently, these measures may be one of the main directions of this research.

The above measures were evaluated separately, and it was finally determined if the focus on "laundry bags" might be a feasible topic for this study. This is because compared with the LUV-R filter, consumers who use Cora balls and laundry bags (Guppy friend) do not need to consider installation and maintenance issues. Moreover, they are simple to operate and easier to use. Since consumers possibly have higher usage and penetration of laundry bags than Cora balls. Thus, the theme of this study is identified as "washing bag".

2.2. Initial Hunt Statement

Based laundry bags found from secondary research may reduce microplastic emissions from garment washing. Therefore, to explore how often and how often users use laundry bags in their daily lives. An Initial Hunt statement is:

"I will study how and how often Chinese graduate students use laundry bags in the laundry process so that I can identify problematic laundry habits and find opportunities for encouraging users to use laundry bags for reducing microplastic emissions and increasing laundry sustainability."

Two participants were found for interviews and observations before starting the study. Male pilot participant A lived in a student apartment, while female pilot participant

B lived in a private house. However, participant A used laundry bags but not for the same reasons as participant B. Therefore, it can be found that although the two participants have the same cultural background, they may have different reasons for using or not using laundry bags due to factors such as gender, living environment, and living habits.

Modify the Initial Hunt statement according to the pilot study, and add to explore whether the habit of using laundry bags may be affected by factors such as gender, environmental factors, and living habits. Thus, the modified hunt statement is:

"I will study how and how often Chinese graduate students use laundry bags in the laundry process, and whether they are affected by gender and environmental factors, so that I can identify problematic laundry habits and look for opportunities to encourage users to use laundry Bags to reduce micro plastic emissions and improve laundry sustainability".

3. Data Collection Methods

"Interviews are a fundamental research method for direct contact with participants, to collect firsthand personal accounts of experience, opinions, attitudes, and perceptions".[10] Then they suggested that although interviews could be conducted online utilizing a remote connection, face-to-face interaction was preferable because it allowed for the discovery of more personal information about the interviewees.

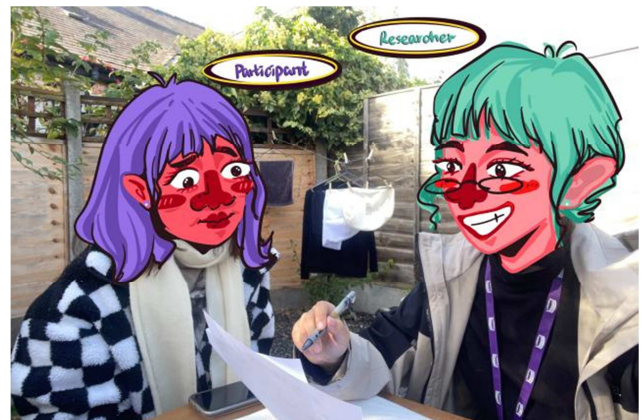


Figure 1. The investigator interviewed the participants.

Martin and Hanington claim that Interviews may be structured and relatively unstructured. They argue that both formats have their advantages and disadvantages: unstructured interviews have the advantage of being relatively comfortable, but depend more on the researcher to control the interview time and content; on the other hand, the advantage of structured interviews is that questions and time are controlled more easily, but formal conversations can create tension and unease in the participants. However, semi-structured interviews, according to Harrell and Bradley, fall in the middle between structured and relatively unstructured interviewing methods. [6] Although the order of questions in their argument that Semi-structured interviews

can be changed freely, there is a uniform standard for the questions. This means that Semi-structured interviews are more flexible than the first two modes.

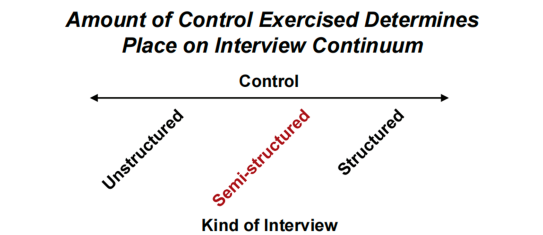


Figure 2. Kind of Interview by Harrell and Bradley (2009). [6]

3.1. Interview Steps

Four participants were invited to a contextual interview to explore the different factors mentioned in the hunt statement. Firstly, to explore whether the behavior of using or not using laundry bags is affected by gender factors, thus, an equal number of boys and girls were selected as interview subjects. Secondly, to explore whether the behavior of using or not using is affected by the living environment, three of the four participants lived in student apartments and one lived in a private house. Finally, explore whether the behavior of using or not using laundry bags was related to living habits and values.



Figure 3. Interviewed participants information.

The purpose of this study is to understand how users think and act using and not using laundry bags. Therefore, of the four male and female participants, two male and female participants maintained disapproval attitudes towards laundry bags, respectively: participant2 and participant4. Moreover, participant1 and participant3 were users of laundry bags.

First, prepare two questionnaires. During the interview, taking into account that participants may or may not use laundry bags, thus prepared two questionnaires for this interview. The questionnaire questions for participants who use laundry bags will ask more in-depth questions about laundry bags' experiences, experiences and attitudes. On the other hand, when faced with participants who have not used laundry bags, researchers need to use another questionnaire, and this questionnaire will mainly ask about the reasons for not using it and the attitude towards laundry bags, and try to find out what the root cause of not using it is.

Secondly, do some preparatory work. For example, send a consent form and an information sheet to the target participants, and briefly introduce the content and subject of the interview; clarify the length of the interview and the main subject of the interview. Wait for the participant to accept the

invitation and confirm the free time and interview location. The choice of interview location may be best in the laundry area or in the visitor's living area, as the environment may help participants recall their past experiences. Because the interview location was limited and could not be done in these two areas, the study brought related products during the interview that could help participants recall, such as laundry bags. During the interview, this could be an effective method, as participants visually and tactilely found memory points from the sample laundry bag.

Then, start the interview. During the interview, you can choose to use a mobile phone or another electronic device to record. The researcher can add or subtract questions by focusing on the participants' responses. Appropriately summarize and repeat the answers of the participants, and conduct secondary confirmation with the participants in the form of rhetorical questions to ensure correct understanding.

Transcribe the participant's conversation into a document after the interview, and clearly mark whether each sentence is from the participant or the researcher.

Project: 'Laundry bags are used when washing clothes'

Code: FH03

Date: 15.10.2022 |

Interviewer: Yushu Dong

Transcriber: Yushu Dong

Length of interview: 50 minutes

Interviewer

Female participant

Interviewer 3

We'll have some questions to ask you today to find out about your laundry habits, mainly whether you use a laundry bag when you do your laundry. Then I'll probably ask you "why" a lot, which is probably my way of doing interviews. It's just to explore more in-depth questions about your behaviour afterwards, so I hope you don't mind. Firstly, a question about the family home. Where do you live now?

Participant1

I'm living in a private house.

Figure 4. Participant3 Transcript.

Challenge 1:

Participant 3's nervousness in the videotaped situation resulted in short and in-depth answers.

Solution 1:

Do not turn off the camera after the formal interview. Record the most authentic and relaxed state of the participants. The results showed that the participants were more active and active under the unconscious interview.

Challenge 2:

Participant 3 mentioned in the interview that the reason for using laundry bags is because of family use, and it is impossible to understand the reasons for the participants' home use.

Solution 2:

The solution was to conduct additional phone interviews with the mom of participant 3 to learn more about the motivation and purpose of the family's use of laundry bags. Remotely interview the mom of participant 3 via mobile phone to understand the direct reasons why the participant was affected by the family's use of laundry bags.

3.2. Design Ethnography: Observation

Observation is an acting skill used to help researcher record visitor behaviors, interactions, environments, events, and objects through careful observation to ensure that further analysis provides evidence (Martin and Hanington, 2012). They also claim that observations are divided into structured or casual observation and structured or systematic observation, in which semi-structured observations are relatively flexible even if they have some guiding problems, and researchers will keep an open mind to observe. On the other hand, structured observations are observed using forms such as worksheets and checklists, which are more cautious and careful. Additionally, Participant observation and

Re-enactments are different types of observation methods. "Participant observation is an immersive, ethnographic method for understanding situations and behaviors through the experience of membership participation in an activity, context, culture, or subculture". [10] Moreover, they believe that even though this observation may be time-limited, it is an important and effective way to connect and empathize with participants. On the other hand, unlike participant observation immersed in a participant's activity, re-enactments are when the researcher asks the participant to re-simulate the activity for observation. Therefore, it is not sure which of these two methods is more suitable for this study, a comparison pilot study was made here to compare which method is more advantageous to the study.

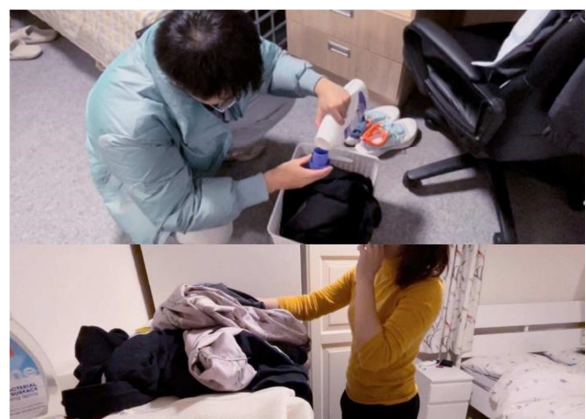


Figure 5. Observed participant 2&3.

Process

To choose the appropriate method for observations, a pilot study was made that observed the same participants, using two different methods: re-enactment and participant observation. First, participant 1 was asked to simulate the

whole process of washing clothes according to the Re-enactments method. For example, during the laundry phase, he just puts the clothes in the washing machine and

does not start it. Participant 1 can properly introduce his laundry process and behavioral purpose to the observer during the simulation. Researchers can record it by video.

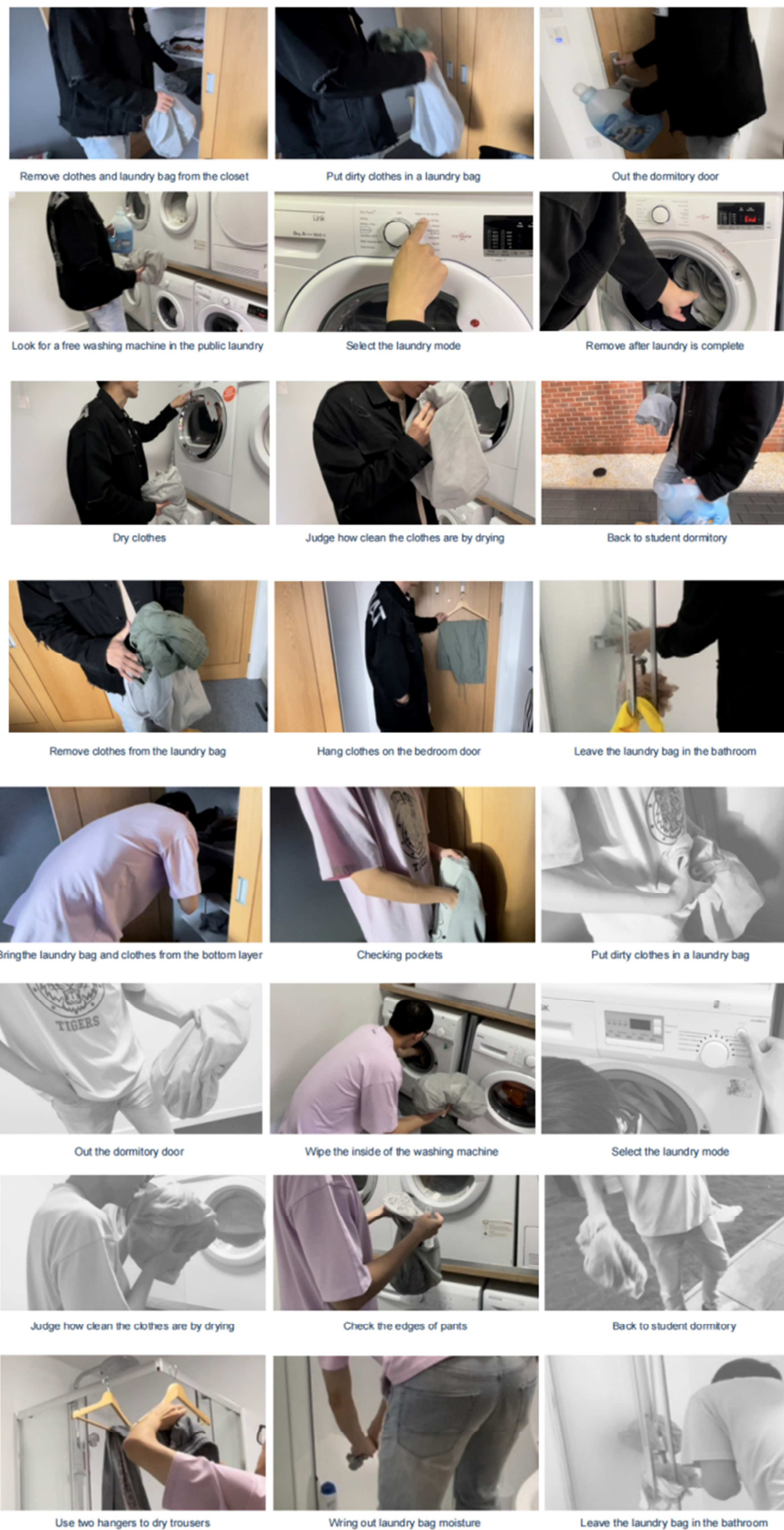


Figure 6. Compare re-enactment and participant observation.

should be written in the document first, and the important details should be taken out and organized in the AEIOU template. This is because researchers can capture everything they see and hear when they watch a film for the first time, but because there isn't much room in the template, researchers have to pick out more important details and arrange them properly. To use AEIOU specifically, follow these 2 steps.

Step 1

The researcher may prepare a computer, a pen, or paper ready for recording, watch the Observation video by themselves, and then note down the important details in the form of draft notes in the AEIOU template. The content of the records may be divided into different stages, for example, the complete laundry activities are divided into laundry preparation, during laundry, and after laundry. It is worth noting that in the process of organizing the "Activities" information, it is possible to focus on the time spent on each activity.

Step 2

After organizing the AEIOU draught notes, highlight the most relevant material for easy review.

Important information should be linked to themes in the AEIOU template. Additionally, the researcher can draw some sketches to help with recording and recall. If researchers encounter a picture that is difficult to describe in words, such as how dirty the washing machine is, they may post some screenshots of the observation video to show the environment. [13]

5. Data Analysis Methods of Interview

Here to analyse the data obtained from the interview, the researcher needs to review the video of the participants' interviews and transcribe the sheet. Additionally, here the views of four participants were organized in the interview and similar or different views were summarized and categorized.

Review the transcribed sheet of the Contextual interview and the recorded video of the participant observation. Mainly observe the 3 participants and what they said and did and summarize the similar points in the end researcher can see the reasons why participant1 and participant3 used the laundry bag.

Both participant 1 and participant 3 demonstrated similar backgrounds. Participant 3 was influenced by her family environment, which led her to start using laundry bags as well. Participant 1 was surrounded by classmates who also had the habit of using laundry bags. Interestingly for participant 2, who does not use laundry bags, none of his close friends or family members is in the habit of using laundry bags. Therefore, the habits of family and friends may influence the use of laundry bags.

Participant 3 claimed that she believes that clothes worn outside, such as duvets, jackets, pajamas, and underwear worn at home need to be washed separately. This is also an important factor in her use of laundry bags.

Participant 3&4 demonstrated this view in an interview

and observation video. Additionally, they believe that the main clothes that need to be protected are underwear, silk clothes, and new clothes. Protection is therefore the main reason they use laundry bags.

Here is an interesting point of view from participant 1. He could not convince himself to use the washing machine directly because the public laundry environment was too dirty, so he made the use of the laundry bag an important factor because he wanted to reduce the contact of his clothes with the inside of the washing machine. Therefore, he could get some psychological comfort from the laundry bag.

The difference between participant1 and 3 is that participant2 believe that the clothes can only be washed clean if they come into contact with the washing machine. Therefore, putting clothes in a laundry bag to wash can affect the cleanliness of the clothes.

Participant1 and participant2 have the same cultural background - Chinese; the same gender - male; the same laundry environment: kingfisher public laundry room.

They disagree on the use of laundry bags, however, which may be due to varying standards and perceptions of cleanliness. For instance, participant 2 was alright about using the public laundry but participant 1 thought it was dirty and required a laundry bag. Compared with female participant3, male participant1 does not pay much attention to clothes, and he does not think that clothes need to be protected. Additionally, adding social media interview with a participant1 who uses laundry bags, he expresses that he does not pay special attention to the material of the clothes to protect the clothes.

If the researcher summarized the behavior, attitudes, and life backgrounds of the 3 participants, we can draw the following conclusions. For participant 2, saving time and money is more important than protecting clothes; for participant 3, protecting clothes from damage was more important than saving time and money; For Participant 1, having a clean laundry environment was more important than protecting clothes.

Researchers can use affinity diagramming to compile these "quotes" and create more specific "findings" after collecting and analyzing data from observations and interviews using different research methods.

6. Finding to Insight

Use patterns to draw insights from the findings. Then create a 2*2 matrix to evaluate the insights to discover which are most plausible. Whether it is the product information of laundry bags including the use, price size, brand, or the possible reduction of micro plastic pollution and other environmental advantages, have not been paid attention to and recognized by the public, resulting in consumers have long ignored laundry bags such products in daily life.

The low presence of laundry bags and the weakness of the conversation lead to the loss of a large number of customers. This can also reduce the purchaser's habit of using laundry

bags in their daily lives while ignoring the micro plastics polluting water resources.

Users and non-users act in their interests and not all factors are considered environmentally friendly. A subset of participants may use laundry bags more frequently because the benefits to their livelihoods outweigh environmental awareness. Similarly, non-users would not use it even if they knew it might reduce micro plastics.

Whether it is the product information of laundry bags including the use, price size, brand, or the possible reduction of micro plastic pollution and other environmental advantages, have not been paid attention to and recognized by the public, resulting in consumers have long ignored laundry bags such products in daily life. This is a bias against the way laundry bags are used. This can lead to losing potential customers about laundry bags, which means that the fewer people using laundry bags, the greater the likelihood of micro plastics polluting water resources.

People who are more concerned about the material of their clothes are more likely to use laundry bags, and those who are unaware and unconcerned about the material of their clothes are more likely to ignore the use of laundry bags.

Polyester clothes shed microfibers, which mean that polyester clothes could be one of the main sources of micro plastic contamination. [3] Yet this type of clothing is very popular with customers. When customers buy clothes and clean them without paying attention to the fabric of the clothes this may increase micro plastic pollution of water

resources during the washing process. [12]

The researchers evaluated the four insights according to the two aspects of Address Micro plastic Emissions and improving laundry experience in the matrix. Choose the most suitable insight.

6.1. Using "How Might We" to Develop a Opportunity

In this section, the insight1 of higher laundry experience and reduction of micro plastic contamination of water resources will be selected for subsequent design opportunity development. The researcher can use the 'How Might We' method to disperse design opportunities using key insights as themes, and finally evaluate the HMW in a matrix to identify the most likely design development opportunities.

HMW is a method of analysis that opens up the mind. It is used in three ways: "How", "Might" and "We" to discover more design ideas and design possibilities. "How" is the assumption that the problem can be implemented and guides the designer on how it should be implemented. "Might" is Cautious and Possible. It encourages the researcher to come up with more ideas. "We" is emphasizes teamwork. It promotes working together on design tasks to solve design challenges.

The first stage is to expand the thinking based on the key insight 1 and use the "HMW" approach to write them down on post-it notes. Second, scholars can refine, combine, and consolidate these related ideas into the same groups. These points are then assessed in the matrix.



Figure 8. HMW Post it notes.

6.2. Evaluation

Thinking with the HMW model is arranged in an evaluation matrix according to different values of user experience and different values of micro plastic pollution reduction.

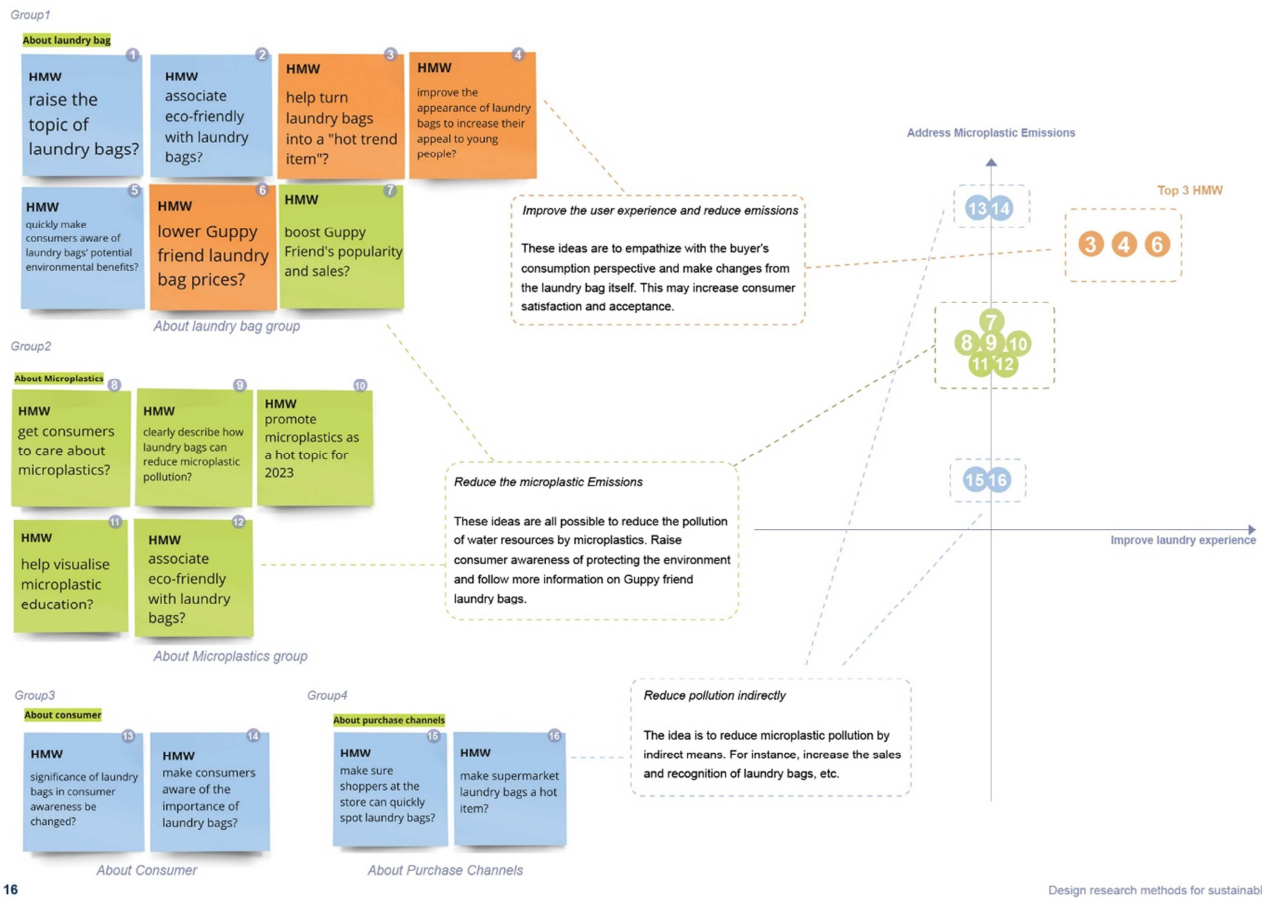


Figure 9. Evaluation matrix.

7. Critical Reflection

7.1. Gibb's Reflective Cycle

Gibb's reflective cycle is a self-analysis through 6 stages: description, feelings, evaluation, analysis, conclusion, and action Plan. [1] Therefore, in this study, I will follow Gibb's Reflective Cycle model for the different stages of reflection. Firstly, describe the experiences and problems encountered in the different stages and the parts that are worth remembering. Next, I will express my feelings about the experience and then assess the strengths and weaknesses of what I have done in this phase, and analyse the problems and limitations encountered. Finally, think about how to improve in the future.

The Hunt statement stage was the first stage of the design research, where we needed to think about the topics and directions we needed to research for the next 6 weeks. As I was feeling torn and confused, I started reading journal articles and eventually found some similar voices in a few articles and collated the useful information in a matrix. I think my strength was that I read some solid literature to help me

identify the topic and find ideas, and synthesised the views of different scholars together to produce a secondary research in hunt statement. However, the idea that "laundry bags can reduce micro plastic emissions" seems a bit limiting. Even while cora balls and guppy friend washing bags can reduce micro plastic emissions and are simple to set up and use, Kärkkäinen and Sillanpää claim that they are not very successful. [7] Similarly, Le et al. make a similar point, arguing that even though both products are easy to use. [10] There are uncertainties, such as the need to manually clean and dispose of the micro plastics collected by the products each time they are washed which ensuring that they do not enter the environment is the ultimate goal. Additionally, the paper I searched for could only prove that Guppy friend brand laundry bags could reduce micro plastic pollution, but no evidence was found to prove that other brands of laundry bags could do the same. Therefore, I believe that in the future I should seek the advice of the course leader in the topic identification stage and find more material to be more rigorous in my research.

One of the methods I employ to gather data is contextual interviewing. To conduct 1V1 interviews, we must first

identify participants who are appropriate for the topic. Because interviews were the method I was proficient in for my previous design study, I've progressively gained some confidence in this step. However, participant3 experienced an unexpected event. I failed to take into account participant 3's extreme shyness and stage fright, which is why she didn't exhibit the same enthusiasm in the daily talk. On the other hand, I freely admit that I should not have chosen any one participant for peer review. My interview preparation materials won't be current for them in this way, which could lead to a loss of enthusiasm. To put it another way, participant 3 demonstrated very in-depth laundry experience and opinions during the peer review phase, but these were not captured during the formal interview. Camera recording could be another factor. The thing I believe I did correctly was to leave the camera on after the interview rather than turning it off straight afterward so I could record a really helpful personal viewpoint and washing experience. To create a fuller picture of the participant, we also incorporated a second interview with the subject's mother. To sum up, I believe that in the future I should select additional peers who are not covered by the participants' list for peer review. Second, I could require a camera shot from a casual angle to let the participants relax. Participants must, of course, sign the consent form.

Analyzing the data is the third phase of this research. In analyzing the data I used the method of AEIOU. I think what I do well is that I record the information in the template by hand and use the green highlight keyword. But I think the disadvantage is that I observed the 3 participants twice, but I only recorded the AEIOU once, and the latest observation video was not analyzed in detail with the AEIOU. The reason for this is that participant3 she exhibited the same behavior in the second laundry as she did in the first so I didn't repeat it. On the other hand, the living environment of participant2 has changed. For example: When I first observed, his background information was: living alone, doing laundry alone, laundry in the public laundry room and studio laundry room. But when I observed him for the second time, he changed his accommodation and lived in the studio with his girlfriend, so his background information became: double living, double laundry, and the laundry location was in the studio laundry room. So instead of using the second observation as the data for my research, I focused on the first observation. In conclusion, I think that in the process of selecting participants in the future, it may be necessary to consider more private information of participants, such as marriage and relationship, financial situation, etc. This may reduce the uncontrollability of participant data.

Use Affinity diagramming and HMW to find findings, insight, and design opportunities. This is the stage that I think feels the most exhausting. I think what I do well is clearly document the finding with micro and after completing the HMW, group similar opportunities together and use different colors to show their priorities. For example, orange sticky notes with higher user experience and reduced pollution emissions are more worthy of attention. However, these

assessments are too personal, and it is difficult to judge the reliability and accuracy of their assessments with a unified standard. Therefore, I may need to learn more about such methods or ask the leader for advice while working on a project.

7.2. *Contrasting Ways of Thinking*

Design thinking methods and design ideas for problems are discovered and transformed. For me, whose design background is product design, it seems that the output of hardcore is the most important result in my design process. And I used to think that the previous research was only the hypothesis of auxiliary results, and sometimes intervened in the research results for self-conscious assumptions, instead of following the facts and user needs. This attitude is likely to lead to the design of products that do not meet user needs. Products; in addition, the previous preliminary research may have some understanding of design research methods, such as interviews and Observation, but just like completing the task, there is no in-depth thinking and analysis of data. Just focus on the stage of collecting data. For instance, the interview is just a review of the transcript and there is no distinction between the semi structured interviews and Unstructured interview questions and the pre-ethic preparation, and there is no peer review stage. This leads to conclusions that may not be perfect. However, this course made me experience another way of thinking. It may be more concerned with user needs, more concerned with processes, and more concerned with facts. It is a step-by-step process. Therefore, the ending of the report is only in the design opportunity stage. This is surprising because, unlike the original intention that I was more concerned with the results in the past, this time I am more concerned about the process of data collection and data analysis and reuse of 'HMW' to obtain richer and more reasonable design opportunities. Therefore, I am influenced by the way of data collection and analysis of this kind of research, I think in the future study stage I will respect the facts rather than trust the experience and assumptions, and follow the steps in the design method to think and research.

8. Conclusion

Nathan Shedroff gave the definition of experience design in "Experience Design": experience design is a design that integrates consumer participation into the design, where enterprises use services as a "stage", design as a "prop", and the environment as a "set" to make consumers feel a beautiful experience during the process. [11] Experience design is a sublimation of design concepts in the information age and experience economy. It is a new design concept, new design methods, and new design concepts that emerge from a new economic background. It emphasizes that design can bring emotional integration to users and trigger profound experiences.

The article provides an overview of the precise procedures and methods utilized to create the numerous methodologies

needed for thorough pre-design research. The difficulties and solutions that might be encountered when employing the strategies are also listed. Additionally, the use of various design research methodologies is supported and encouraged here because these organized and methodical approaches may aid student designers in broadening their perspectives. The student designer's design abilities and thoughts are improved by using and understanding design methodologies. Experience design, as a new design method, will bring new vitality to traditional design, strengthen emotional and experiential attention in traditional design, and enhance product value. [14] Experience design starts from life and context, shaping sensory experience and thinking identity, in order to capture consumers' attention, change consumer behavior, and find new survival value and space for products. [15]

Acknowledgements

This work is supported in part by the Loughborough University UXSD module teaching team. This article is funded by the research project on the optimization of the content and teaching methods of the "Design Aesthetics" course guided by aesthetic education (Project No. YSJG202201).

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