User Interface Report

Evaluation on the Success of a Microwave Panel

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HCDE 301
January 20, 2021

I. Introduction

Microwave ovens are one of the most common household cooking appliances around the world. Approximately eighty to ninety percent of families in many countries worldwide own microwave ovens in their house [1]. Users find them convenient to heat food items. However, with personal experiences of struggling to use a particular microwave oven brand, such common appliances reflect a general terrible user interface design for user experiences. How successful are the user interface panels in meeting users' needs for this particular microwave brand? This evaluation report introduces the microwave oven background information, evaluation methods showing several design criteria, results and discussions of a microwave panel's current issues under these criteria, and recommendations for possible solutions.

II. Background

The intentional users of microwaves can be both male and females from all social classes. Microwaves can heat and cook food efficiently and quickly because they channel heat energy directly to the molecules (tiny particles) inside the food. As the microwaves penetrate the food and travel through it, they make the molecules inside it vibrate more quickly for heating[2]. They can heat any food, including liquids. They do not need preparations. Users put the food inside, and the microwave does its job.

Usually, a microwave has a doorknob and a panel, as shown in Fig.1. The doorknob allows users to open the oven and put in the material they want to heat up. The panel acts as a microwave controller, containing a tiny LED screen on the top for showing time and a few buttons below for cooking and option selecting. Inside, a plate automatically turns itself, and the light automatically lights up when it starts heating.

Microwave ovens have various functions depending on different brands. The panel for this particular microwave oven from top to bottom, showing a closer look in Fig.2, contains a screen, several buttons with names, a small keypad, and two more buttons. It seems straightforward, but when users put it in action, frustration starts to show up.
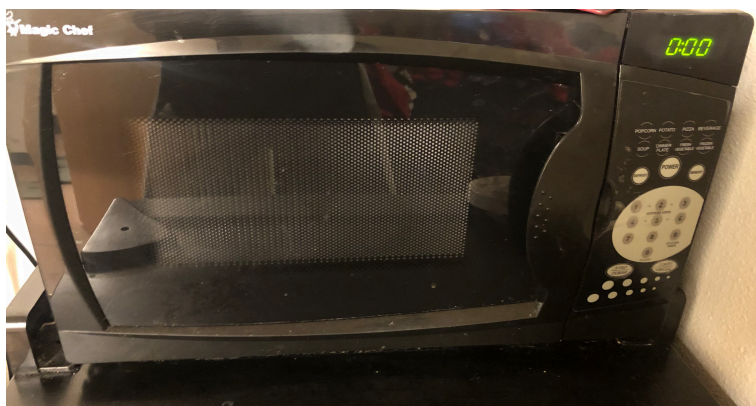

Fig.1 Overall look of a microwave

Fig.2 Closer look of a microwave panel

III. Methods

A. Visibility of system status

First of all, the user interface design should always inform users about what is happening in the system to change it or make interactions to reach their goal. A lack of information often equates to a lack of control.

Secondly, no matter when the users interact with a system, they need to know whether that interaction is successful. The users need to know whether the system goes through the request. Proper feedback for particular user interactions is an essential guideline of user interface designs. The purpose is to keep the users informed of the system status and to allow them to keep their interactions in the way they want to achieve their goals without wasting time and effort. Besides, immediate feedbacks allow users to realize the errors and recover as soon as possible.

Lastly, it is essential that the feedback can communicate the system status to the users. Excellent communication of the system creates reliability and a great user experience. The users can feel in control to rely on the system for whatever their goals are. The essence of visibility of system status is not to blindfold the users[3].

B. Flexibility and efficiency of use

New users to an interface often require instructions and need straightforward and obvious labels to understand how the system works. A flexible and efficient user interface should contain various methods for users with different system experiences to achieve the same goal. The system can have a simple, straightforward method of a task for new users. On the other hand, it should also include accelerators — faster and alternate methods of completing a frequent action — for advanced users to accomplish their tasks faster. Accelerators are enhancements of the system, and they do not prevent new users from understanding the system. Accelerators are noticeable but do not take away the most attention. Adding proper accelerators to an interface improves flexibility and efficiency of use[4].

C. User control and freedom

No matter how familiar the users become with the interface, they still operate the system by mistake. In this case, users need a clear sign showing the back-step option to redo the interaction without doing more. Users should be able to quickly correct mistakes or backtrack on choices made[5]. If a user interface does not contain certain features, the users will feel trapped and frustrated for starting over. Besides, the back option should meet the users' expectations by returning to the right state that they wanted before. Users should discover the back-step option easily to quickly recover from their mistakes instead of looking everywhere and waste unnecessary effort. Overall, with these particular features added to an interface, the users can have freedom and control while using[5].

IV. Results and Discussion

A. Visibility of system status

This particular microwave oven brand contains serious problem of showing the system status. As a personal user, the problems have created many frustrations. As the buttons are shown in Fig.3, several buttons indicate different heating options. However, the system fails to show what the heating option is in any form or anywhere on the panel. The user might assume that the LED screen at the very top can show the options, but it does not. The users might still be confused after they pressed a button for a specific option. To improve its visibility of system status for presenting various options, the interface must show it somewhere on the panel, and it needs to be clear and easily discoverable.

Fig.3 Labeled figure of a microwave oven

B. Flexibility and efficiency of use

The microwave oven forbids the users to input the exact time they want for heating their food items. The time is set to either the exact minute based on the keypad numbers or 30 seconds by pressing the start/+30 sec button on the bottom right-hand corner, as shown in Fig.3. For instance, if users want to set the time to forty-five seconds, they can either press button "one" and wait for 15 seconds to put the food in or choose to heat thirty seconds or one minute. In this case, the product is bearing with the product, not taking advantage of the product. This feature creates a lot of frustration and wastes users' time and unnecessary effort. To improve its flexibility and efficiency for use, the panel must add some accelerators for users to accomplish their tasks quickly and easily.

C. User control and freedom

The number entering feature on the keypad fails to allow the user to take a back-step if the user accidentally presses the wrong number. For this particular brand, once the user presses a number, the microwave starts immediately for that number of minutes. All the user can do is stop the microwave, clear all numbers, and re-enter the numbers again. Even for most other brands, if users enter the keypad's wrong number, they have to clear all the numbers and redo them. Users often make mistakes, even for those that are very familiar with the product. To improve user control and freedom, the system should include a feature to allow users time to recover their mistakes and help them get back on track quickly.

V. Conclusions

In conclusion, based on the three user interface design criteria, microwave ovens indeed contain many unpleasant features that negatively affect user experience as one of the most common daily household cooking appliances worldwide, microwave ovens should not be like this. The report will present several high-fidelity mockups to show possible solutions suggestions for these particular issues in the next section.

VI. Recommendations

The high-fidelity mockup, as shown in Fig.4, introduce the recommendations to improve the microwave panel. The overall theme color and layout are based on the original microwave panel. The panel's new features will help the interface improve visibility of system status, flexibility and efficiency of use, and user control and freedom.

First, the recommended LED screen shows more features. From left to right, the very top of the screen shows the defrost option, date, and time. Next to the time, it contains an on/off light showing whether the microwave oven is turned on. The bottom shows the different cooking options; in this case, it is "soup." If the microwave is in standard heating, it will show nothing on that spot.

Second, instead of starting immediately after the users press a number, the interface now allows users to enter the exact time they want. The buttons next to number zero on the keypad's bottom row allow the users to clear all or backspace the time inputted if they make a mistake.

Lastly, the button on the bottom left corner of the original interface combines "STOP" and "CLEAR" together, and the button on the bottom right corner combines "START" and "+30 SEC" together. This feels not right for the users; usually, "START" and "STOP" should be the same button. So the revised design combines "START" and "STOP" and left "+30SEC" by itself since a "CLEAR" feature is included in the keypad section. The revised design also shrinks the three buttons in the feature and magnifies the bottom two buttons since they will be used more frequently.

In conclusion, the original user interface design of a microwave oven needs a redesign. The recommendations mentioned earlier can improve the design more on the visibility of system status, flexibility and efficiency, and control and freedom.
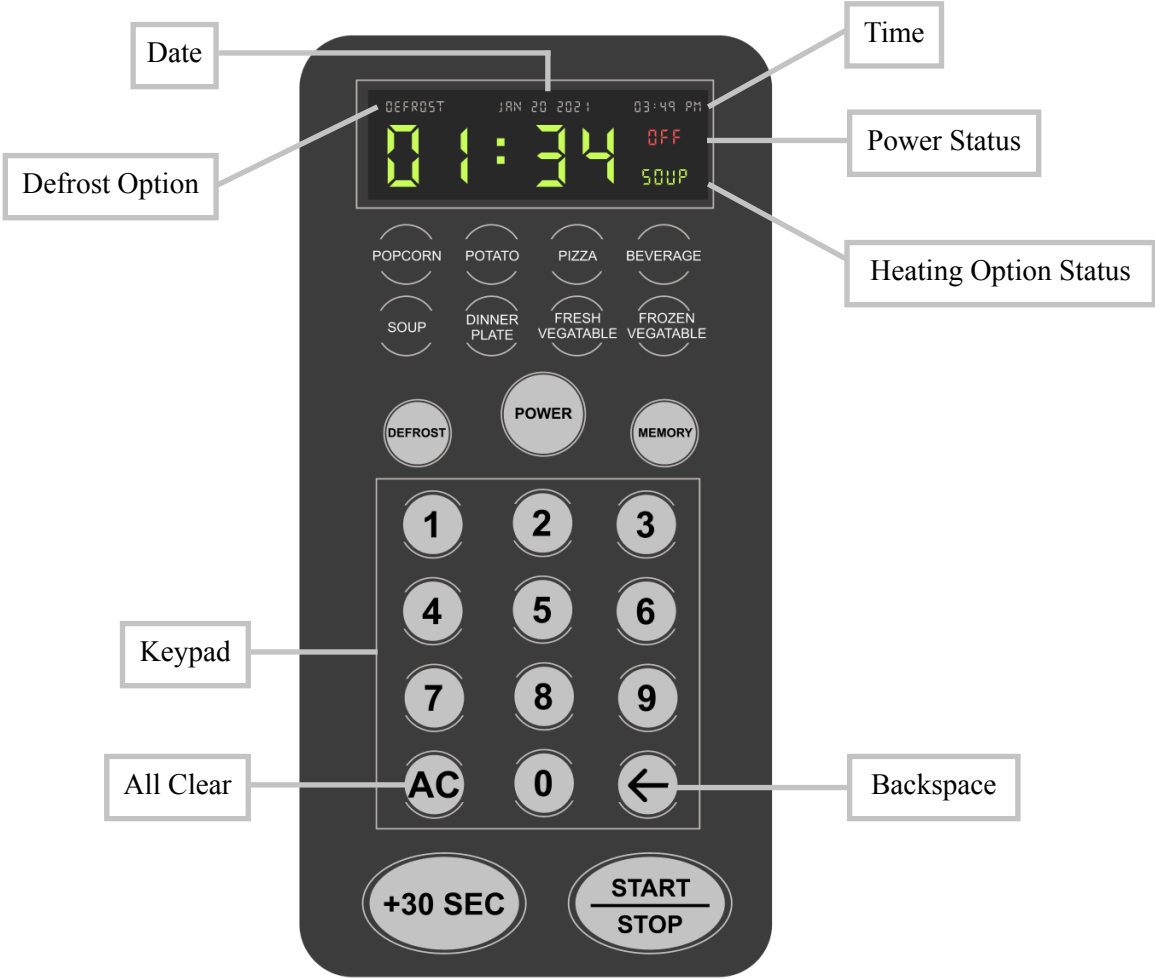

Fig.4 High-Fidelity mockup of microwave panel recommendation

VII. References

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