

UX Testing & Evaluation of peelers

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Executive Summary:

Peeler is a kitchen tool used to peel potatoes, carrots, apples and other vegetables and fruits. It is very common in every families. Through two-three months of project, I have done research and development on two important peelers, this article shows the process of user test, data analysis and some outcomes. In addition, the structure of this report is derived from the advice given by Dr. Jenkins.

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Design Issues:

There are essentially two types of kitchen peeler. Type 1 is called 'straight peeler', has the peeling blade parallel to the handle, resembling a knife. And type 2 is called 'Y - peeler', whose blade perpendicular to its handle, which is closely resembling a [safety razor](#). By using photo and video diaries, A/B testing, try it myself, empathy tools, user interviews and brainstorming webs methods, I have tested and studied the two types of common peelers, and found some problems existing in the use of them, also some parts that can be improved.

First of all, the handle of the peeler needs to be more fit the shape of the arc of the palm, and will feel more comfortable when it is used for a long time and at a higher frequency. And if the handle is too thin and too small, it will be difficult to hold on to the people whose finger joint are painful. Then I found that frequency of using wrists was very high when used peeler (especially Y-type), which made pain of wrists. For the elderly, housewives and other people, it may lead to wrist disease. Also, some postures of peeling may be dangerous and hurt the fingers. It should be avoid putting the finger in the area where blade might 'arrive'. At last, because the blade gap is small, it is dangerous to use hand directly to clean the starch and soil on the blade. More of these issues should be considered for the development of products.



Type1(A)



Type2(A)

Design Interventions:

For the development of Type1, I started by finding that the handle of the peeler was too thin to hold it for people who couldn't use their joints flexibly. Hope that the shape of the handle would fit more closely with the palm of the hand, reducing the bending and exertion of the fingers as much as possible, and at the same time saving more effort, I had made the following changes (Type1(B))



P1



P2

The whole peeler is shaped more like a mouse(P1), and holding it in hand, then peeling. This shape reduces the movement of the joints and peels more with the power of the hand. In order to clean the blade, and the store the cleaning tool, a cleaning brush is designed at the tail, which can be taken out when necessary. (P2)

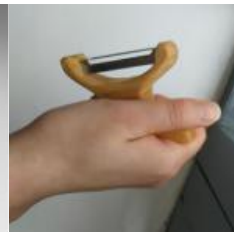
For the development of Type2, first of all, it is hoped to change the direction of handheld handle so as to reduce the excessive bending of the wrist during peeling; secondly, the handle should be more suitable for the palm of the hand and makes people feel comfortable in use.



P3



P4



P5

The handle of Type2 (B) is like a butterfly(P3), and the arc of the tail is close to the palm of the hand. After holding the handle, the blade is in a parallel position with the hand, without bending the wrist(P5). Of course, the tail of the Type2 is also stored with a clean blade that can be pulled out. (P4)

Test Method:

In order to test the two general peelers and the two concepts I have developed on the basis of previous research, which is better, what are the advantages and disadvantages of each? I'd like to do a user experience test on the four peelers.

First, I made a few prototypes, drilled holes and inserted the blade to make the prototype work like a normal peeler. Then I bought several bags of potatoes of almost the same size at the supermarket, so that the data and results of the experiment would be more accurate when the basic conditions and the test supplies were almost the same. The picture below is my questionnaire(P6)

QUESTIONNAIRE ABOUT PEELERS No.____



Type1(A)



Type1(B)



Type2(A)



Type2(B)

Part 1:Your information

Gender _____ Age _____ Occupation _____ Left or right hand user? _____

How many times you use peeler? _____

A. Often (almost everyday) C. Seldom (1-3 times a month)

B. Sometimes (1-5 times a week) D. Never

Part 2:Using peeler

Time (seconds)

Type1(A) _____ Type1(B) _____ Type2(A) _____ Type2(B) _____

Weight(grams)

Type1(A) _____ Type1(B) _____ Type2(A) _____ Type2(B) _____

Part 3:Your Experience (choose scale reflect your experience)

Type1(A):

Aesthetics Rating UglyoooooooooBeautiful
Comfort Rating UncomfortableoooooooooComfortable
Functionality Rating BadoooooooooGood
User Experience Rating NegativeoooooooooPositive

Type1(B):

Aesthetics Rating UglyoooooooooBeautiful
Comfort Rating UncomfortableoooooooooComfortable
Functionality Rating BadoooooooooGood
User Experience Rating NegativeoooooooooPositive

Type2(A):

Aesthetics Rating UglyoooooooooBeautiful
Comfort Rating UncomfortableoooooooooComfortable
Functionality Rating BadoooooooooGood
User Experience Rating NegativeoooooooooPositive

Type2(B):

Aesthetics Rating UglyoooooooooBeautiful
Comfort Rating UncomfortableoooooooooComfortable
Functionality Rating BadoooooooooGood
User Experience Rating NegativeoooooooooPositive

Considering the influence of gender, age, occupation left or right hand using and the frequency of use of the peeler in daily life on the results of the experiment, I will collect these basic information in the questionnaire.

The second part of the questionnaire is to test the efficiency of peeling. I'm going to analyze the efficiency in terms of how much time it takes to peel and how much food is wasted. Because the size of the potatoes purchased was nearly the same, the total time from the beginning to the end of the peeling of the potatoes per participant; The

weight of potatoes is weighed before and after peeling, and the weight of peeled potatoes can reflect the waste degree of potatoes.

The third part reflects the satisfaction of the user experience. Aesthetics is to see whether the participant is satisfied with the appearance of the peeler. Comfort Rating refers to the comfort of the hand when the participant holds the peeler. Functionality rating is more inclined to peel smoothly or not. For User Experience Rating, which is to see if the participant is satisfied with the whole peeling process.

For data, I choose Interval Data. Interval data always appears in the form of numbers or numerical values where the distance between the two points is standardized and equal, and there is no natural zero point. (Bhat) I put two adjectives at starts and ends of the option, and the participants chose a circle that reflected their feelings. The closer the circle is to which adjective, the stronger the tester feels. The reason for choosing 10 circles is that the peeler product can be evaluated by the participant, and there is no neutral option.

For the choose of participants, i need to think about that how well my participants can reflect my target audience. It is better to choose the people targeted by the development design concept as participants in the test. So I chose old people, housewives, people who do a lot housework as many as possible as test participants. To avoid the possible impact of gender differences on the experiment, I chose 12 men and 12 women, aged from 20 to 68, and they had different careers, which makes my test participants diverse and representative.

After I bought the scales and other measuring tools, I invited 24 test participants to have the experiment. In order to ensure the accuracy of the test results and avoid confusion in the evaluation of the four peelers by the participants, I asked the test participants to fill out the evaluation on the questionnaire for every product test after they completed, instead of all four being completed together.

Sometimes, the order in which participants test their products also affects the results of the tests, as participants become proficient with the amount of time they peel, or as the peeling time increases, the participants' hand pain, which will slows down the peeling speed. For example, the order of the first participant's test is 1 / 2 / 2 / 3 / 4 / 4, and the second, the third participant's order of testing the product is 2 / 4 / 1 / 3, and 31 / 1 / 4 / 2, and the fourth participant's order of testing is 4 / 3 / 2 / 2 / 1, respectively. (Statistics how to, 2014).

Results:

After the test of 24 participants, I filled out their data in the questionnaire in the table, and calculated the average for each item (the average was retained to two places after

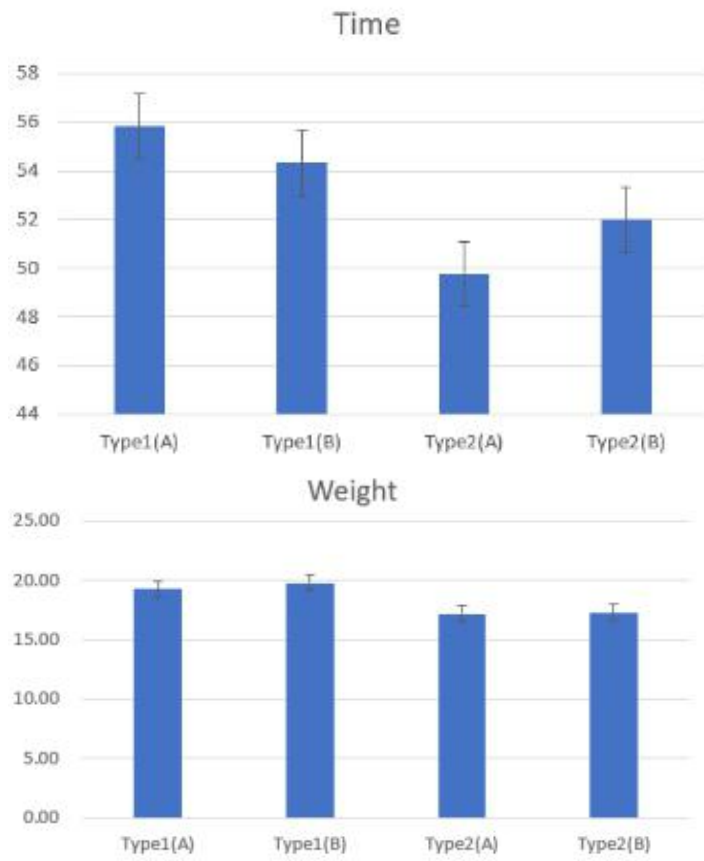
the decimal point). As shown below (P7)

Participant number	Basic Information					Usability metrics Type1(A)		Experience metrics Type1(A)				Usability metrics Type1(B)	
	Gender	Age	Occupation	L/R hand use	Frequency	Time (seconds)	Weight (grams)	Aesthetics Rating	Comfort Rating	Functionality Rating	User Experience Rating	Time (seconds)	Weight (grams)
1	F	20	student	R	sometimes	61	22	9	5	7	6	42	10
2	F	21	student	R	sometimes	56	25	8	6	8	6	40	20
3	M	20	student	R	sometimes	61	20	7	6	8	7	78	25
4	M	20	student	L	sometimes	43	20	7	5	5	6	36	30
5	M	21	student	R	often	33	15	8	6	8	7	58	35
6	F	39	housewife	R	often	69	25	5	5	6	7	55	20
7	M	45	Chinese shop owner	R	sometimes	60	30	8	8	5	6	76	15
8	F	40	Chinese shop owner	R	often	49	17	5	6	5	7	53	19
9	F	47	housewife	R	often	45	15	6	5	5	6	60	20
10	M	34	Real estate agency staff	R	seldom	61	20	7	5	5	6	70	15
11	F	37	Real estate agency staff	R	sometimes	63	25	7	7	6	7	42	20
12	M	19	student	R	seldom	49	25	5	6	6	7	59	30
13	F	31	housewife	R	often	39	25	6	5	8	7	69	30
14	M	31	Staff in Swansea Uni	L	seldom	47	20	7	6	7	7	71	18
15	M	68	retiree	R	sometimes	68	15	5	5	6	6	50	21
16	M	67	retiree	R	sometimes	84	15	7	6	7	7	40	20
17	F	65	retiree	R	sometimes	54	30	6	7	7	6	62	35
18	F	24	waiter in restaurant	R	often	42	17	4	7	6	7	60	20
19	F	49	housewife	R	often	58	10	5	6	6	7	40	10
20	M	21	student	R	often	58	15	8	7	7	6	41	5
21	M	23	student	R	sometimes	54	12	7	7	8	7	38	10
22	F	23	Chinese shop owner	R	sometimes	45	5	6	5	6	7	39	12
23	F	39	housewife	R	sometimes	67	20	5	5	6	6	52	20
24	M	68	retiree	R	often	74	20	5	6	7	6	73	15
average		36.33				55.83	19.29	6.38	5.92	6.46	6.54	54.33	19.79

Experience metrics Type1(B)				Usability metrics Type2(A)		Experience metrics Type2(A)				Usability metrics Type2(B)		Experience metrics Type2(B)	
Aesthetics Rating	Comfort Rating	Functionality Rating	User Experience Rating	Time (seconds)	Weight (grams)	Aesthetics Rating	Comfort Rating	Functionality Rating	User Experience Rating	Time (seconds)	Weight (grams)	Aesthetics Rating	Comfort Rating
7	6	6	7	41	12	8	7	7	7	50	15	8	8
7	6	7	8	57	20	9	8	6	6	65	15	9	9
5	8	8	5	59	25	7	7	7	8	60	10	8	7
7	7	6	7	38	10	8	6	8	8	39	20	10	7
8	7	7	7	40	15	9	8	6	8	46	22	9	6
5	6	6	5	66	17	5	6	7	7	52	25	6	8
6	7	5	8	72	20	8	6	9	7	65	22	7	7
5	7	6	7	35	25	7	5	8	8	34	20	7	7
6	6	5	8	49	20	5	5	7	8	57	5	8	8
6	5	7	6	42	25	6	6	7	7	58	19	7	5
6	5	5	7	47	10	7	6	8	6	34	23	6	5
5	5	6	7	52	19	7	5	7	5	56	25	7	5
8	6	7	7	37	10	8	6	6	8	49	20	9	7
6	7	8	7	62	15	7	7	8	7	68	15	8	5
5	6	8	7	59	25	8	6	7	7	62	22	6	7
5	5	7	6	69	25	6	5	7	7	50	10	7	5
6	7	6	5	58	23	5	8	7	8	55	10	7	7
5	6	5	7	35	10	4	8	6	8	54	22	6	6
6	5	7	8	43	13	4	7	7	7	56	15	7	7
5	7	7	8	36	10	6	6	7	6	39	15	8	5
5	6	8	7	39	5	8	7	8	7	49	15	6	5
6	6	7	7	57	20	7	8	8	7	48	10	6	6
5	6	5	6	40	18	6	7	8	6	43	25	6	7
6	6	7	7	61	20	5	7	6	7	58	15	7	8
5.88	6.17	6.50	6.83	49.75	17.17	6.67	6.54	7.17	7.08	51.96	17.29	7.29	6.54

P7

Based on the average of each item, I use a bar diagram to show it. (P8)



P8

(The 95% confidence interval is the default selection in bar diagram)

The time and weight of peeling are two important criteria for measuring the efficiency of peeling. In terms of peeling time, Type1 (A) and Type1 (B) spend the longest time and waste more weight than Type2 (A) and Type2 (B). Carefully compare the two Type2 (A) he Type2 (B), peelers with almost the same amount of weight wasted, but Type2 (A) saves more time.



P9

As for evaluation of customer satisfaction with product experience, each item is 10 points, so I compared them in the same chart (P9), and each color represents a criterion. In terms of overall trends, Type2 (A) scored the highest, followed by Type2 (B) and Type1 (A), Type1 (B) at the bottom. Compared with each small project, Type2 (B) seems to be better than any others in terms of Aesthetics Rating. The shape of 'butterfly' peeler seems very popular.

	Participants	Type1(A)Time	Type1(B)Time	Type2(A)Time	Type2(B)Time
For old people and housewife	1	69	55	66	52
	2	45	60	49	57
	3	39	69	37	49
	4	68	50	59	62
	5	84	40	69	50
	6	54	62	58	55
	7	58	40	43	56
	8	67	52	40	43
	9	74	73	61	58
	average	62	55.67	53.56	53.56

P10

To see if the conceptual design of this development really helps special people (people who need regular wrist use, people whose finger joint are painful, etc.) to improve the efficiency of peeling, I picked out the test data for housewives and the elderly. Separate analysis is carried out. (P10) I found that the development of the concept of Type1 (straight peeler) has significantly improved the efficiency of peeling.

In combination with interviews with each participant after the test, Type1's development allows them to better hold on to the peeler and feel relaxed and effortless when peeling.

In order to further verify the results, I use the Excel table for data analysis. Since my sample size was less than 30, I chose to use *t*-test to analyze (Tullis and Albert, 2008). Fill out 0 as 'Hypothesized Mean Difference'. The outcome of 'p (T ≤) two-tail 'also shows this significant difference between the two products

At the end of the test, a male student said that the Type2 (B) handle was too small to hold and did not feel comfortable. (P11) I was surprised because this was different from the results of several female students I tested earlier, and I thought it was related to the size of the palms of men and women, so I analyzed the Type2 (B) statistics by sex.

When comparing the Comfort Rating of male and female for Type2 (B), it was found that the score of female was significantly higher than that of male, indicating that the handle size of Type2 (B) was not friendly to people with larger hands. (P12)



P11

	M	F
Type2(B) Comfort Rating	7	8
	7	9
	6	8
	7	7
	5	8
	5	5
	5	7
	7	7
	5	6
	5	7
	5	6
	8	7
average	6	7.083333

P12

Evaluation and Conclusions:

Combined with the above data analysis, I have come to the following conclusions:

1. Type2 (A) is the best peeler not only in terms of efficiency but also user experience.

2. For Type1 (straight peeler), its user experience is the worst. But the improved Type1 (B) greatly improves the efficiency of use, especially for the old people, it can save more effort and move more easily.
3. The appearance of the developed design of Type2 (B) has been well evaluated, but the prototype did not take into account the size of different groups of people, resulting in Type2 (B) can not be widely used in the majority of people.

After each participant finished the test, they talked to me about a lot of personalized ideas. For example, one participant suggested that my Type1 (B) prototype could be made of transparent material, so that he can see clearly when peeling and increase the efficiency of peeling. I think my questionnaire needs to be added a column called 'personal advice and ideas', leaving participants to record their thoughts after they test. Secondly, for participants, if more people with relevant medical knowledge were selected for testing, the study result would be more professional. Of course, I also think that there are still many shortcomings in this test, for example, not considering that the blade becomes not sharp when many participants are tested, which will affect the efficiency and experience of the later participants in peeling.

Many interesting findings come not just from looking at charts and data, but from conversations and interviews with participants after testing. As a designer, it is the most direct and quickest way to get user experience when talking to participants, while questionnaire, data analysis and other methods can confirm the conclusion more accurately.

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