

Heuristic Design Evaluation for Team Chartruese

Evaluators: James Getzendanner, George Harris, Katherine Murphy, and Melissa Yu

Introduction

We reviewed your prototype individually and as a group and found that while in many cases it improved upon the process of splitting a check unaided, several significant usability problems hinder its current implementation. Several small inconsistencies in interface elements are noted below. Also, changes to the slider widgets found on several pages would resolve problems using them on a small touch-screen device, and a more substantial redesign of the input method on those screens could anticipate users' expectations and further streamline operation. Finally, the most significant change we would recommend is to reverse the model under which food items are associated with customers so that food items are dragged to people. Specific violations are described and categorized below:

Summary

Heuristic	H1	H2	H3	H4	H5	H6	H7	H8	H9	H10
Severity 0	0	1	0	0	1	0	0	0	0	0
Severity 1	2	0	0	1	0	1	2	0	1	0
Severity 2	1	1	2	5	0	0	3	0	0	0
Severity 3	4	0	1	1	1	0	1	0	0	0
Severity 4	0	1	0	0	0	0	1	0	0	0
Total	7	3	3	7	2	1	7	0	1	0

Evaluation

1. [H4 Consistency and standards] (Severity 2), reported by 2 evaluators
Upon entering my paycode into the device, I hit backspace instead of return because I expected return to be the bottom-right button as it is on most other devices (e.g. computer numpad, ATM PIN pad).

2. [H7 Flexibility and efficiency of use] (Severity 1), reported by 2 evaluators
I had to press Next on screen after pressing return to confirm entry of my pay code. Since there is only one way to proceed from this first screen, and I just pressed a button confirming my entry of the pay code, why not just take me to the next screen?

3. [H1 Visibility of System Status] (Severity 2)

The system does not provide positive feedback when the paycode entered is recognized. It is unclear that pressing the 'next' button will provide this feedback.

4. [H9 Help users recognize, diagnose, and recover from errors] (Severity 1), reported by 2 evaluators

The "Receipt Confirmation" screen asks a rhetorical question, "Is this your receipt?" The navigation buttons below seem to answer this question, but not with "yes" or "no" as I would expect. It looks to me like the right-hand buttons are the "yes" options, and the left-hand is the "no" option.

5. [H3 User Control and Freedom] (Severity 3), reported by 2 evaluators

It is not possible to set the tip slider to a round dollar number, or to any particular number. If the user wishes to do so they are unable, as only certain values can ever be made to appear using the slider.

6. [H1 Visibility of System Status] (Severity 3)

While adjusting the tip slider, it is possible to move the marker to values that do not exactly correspond to a round percentage. Although it appears possible to set the tip to these values, the slider immediately snaps to the nearest value corresponding to a round percentage when the user stops adjusting the slider.

7. [H1 Visibility of System Status] (Severity 3)

When the amount of the tip displayed on the tip slider exceeds \$9.99, not all of it is visible on the slider. In combination with problems 4 and 5, this makes it difficult to ascertain the current value of the tip.

8. [H1 Visibility of System Status] (Severity 3)

The tip percentage displayed below the tip slider is obscured by the user's finger and is not visible at any time while the slider is in use.

9. [H6 Recognition rather than recall] (Severity 1)

Rounding up. I do it to all the receipts I receive while paying for food. Why doesn't the phone provide a "rounding up" option, or just does it? I don't really want to pay \$12.94. But if someone else is paying \$14.44, do I round up or down? I want to see options for that, and I don't want to piss off my friends.

10. [H7 Flexibility and efficiency of use] (Severity 1)

Do I have to deal with cents? I don't like dealing with cents. What if someone in my group follows this app religiously and I can't pay my cents? Can we just drop the cents to make life easier? Even if it means I pay 46 cents more...

11. [H2 Match between system and the real world] (Severity 2), reported by 2 evaluators

Using a continuous vertical scrolling mechanism to choose a discrete number of customers when evenly splitting the bill doesn't match the way people think. You can't have fractions of people, why give the choice?

12. [Bug] (Severity 1), reported by 2 evaluators

Tip and Total on the "Bill Confirmation" screen don't reflect the tip I just entered, but the individualized totals do. Individual totals don't seem to reflect the individual's share of the tip either.

13. [H7 Flexibility and Efficiency of Use] (Severity 3), reported by 2 evaluators
Changing guest names is slow enough of a process that several reviewers skipped it, although we disagreed about whether the ability to do so was worth keeping. Some of us thought naming would be helpful when tied to the address book on the phone, and one thought names should be done away with in favor of colors, numbers, letters, or pseudonyms (Alice, Bob, etc.).

14. [H1 Visibility of system status] (Severity 1)
What confused me was when I split the bill by items and then I told it to split up the remaining items, the beer box ended up with six icons in it. Did the other users pay for a part of the beer as well? Because two users were in it twice, does that just mean they cancel out the other users? I didn't understand what was happening here.

15. [H7 Flexibility and efficiency of use] (Severity 4), reported by 3 evaluators
When I had to give each person their own meal and drink, it frustrated me. First I had to find the meal, and then the drink, and drag the right icon to it... eight times! Couldn't there be a screen that asks, "Albert got:" and then I pick from a list of items on the receipt. Maybe add another little check box that is for "This is the only person paying for this item" so it is removed from the list and the list gets smaller. The boxes and the icons aren't intuitive or quick and efficient. I.e. dragging food to person, instead of person to food.

16. [H2 Match between system and the real world] (Severity 4), reported by 4 evaluators
Having to drag the customer to the food is confusing. Dragging the food to the customer is more intuitive. The way I see it, people will tend to think "this food is mine/yours/his" and drag the food TO the person, not the other way around. On your site, you say "drag food to people" but your prototype does otherwise, so I'm not sure which one you mean to do.

17. [H4 Consistency and standards] (Severity 2)
The "Edit Customer List" screen uses two different types of buttons to add and remove guests. I like the X buttons well enough, but there's no + button to go with them, so it takes me a while to read the text on the other buttons and find "Add Customer". Consider requiring the user to set up the customer list in a separate step before dividing items up. If you do this, you can remove the confirmation dialog on addition/deletion of a guest (because guests won't have any items tied to them yet), and more generally reduce the task of enumerating guests to that of specifying a small integer number of them.

18. [H4 Consistency and standards] (Severity 2)
The "Edit Customer List" screen uses two different terms to refer to the people among whom the bill is to be split: guest and customer. Pick one and stick to it, or make a clear distinction between the use of these two terms.

19. [H7 Flexibility and efficiency of use] (Severity 2), reported by 2 evaluators
On the "Split Meal by Items" screen, it was again not obvious to me that dragging scrolls the list of receipt entries. Some kind of visual cue would go a long way, I think, although iPhone owners may already be trained to drag first and ask questions later.

20. [H7 Flexibility and efficiency of use] (Severity 2), reported by 2 evaluators
On the "Split Meal by Items" screen, while trying to drag the list of receipt entries, I repeatedly accidentally clicked/tapped an item, taking me somewhere I didn't want to be. We concluded that this problem is likely to go away on an actual touchscreen iPhone.

21. [H7 Flexibility and efficiency of use] (Severity 2)

The scrolling mechanism for the row of food items is somewhat inefficient. Scrolling only a few items at a time (since the food item buttons should be large enough to be easily visible) is inefficient and would get repetitive if you had a lot of different items. That combined with having to drag customer to food (if that is the case) would force users to go through the food items one by one, rather than by customer.

22. [H1 Visibility of System Status] (Severity 3)

At times the subtotal, tip, and total shown on the "Adding in Tip" screen are obscured by the user's hand or finger, making them difficult to see.

23. [H4 Consistency and Standards] (Severity 2)

The keyboard used for guest name entry differs from the standard iPhone keyboard used in all other iPhone apps, making it initially awkward to use.

24. [H4 Consistency and Standards] (Severity 2)

Guest names can be changed when splitting the bill by item, but not when splitting the bill evenly.

25. [H4 Consistency and Standards] (Severity 1)

Tapping the name of a guest while splitting the bill by item gives feedback that seems to indicate something has happened, but it is not clear what has.

26. [H4 Consistency and Standards] (Severity 3), reported by 2 evaluators

The "Split Unclaimed Items" screen does not provide a "confirm" button, instead using the "Back" button for that purpose. On all other screens this button takes you to the last screen without saving your state whereas here it is used to apply changes. The lack of an explicit confirmation button is confusing.

27. [H5 Error Prevention] (Severity 3), reported by 2 evaluators

The function of the "Split Unclaimed Items" is initially unclear. While it is obvious what selecting particular items on the screen does with some experimentation, it is easy to incorrectly split items on first use, requiring the user to either start over or manually remove guests from individual items.

28. [H5 Error Prevention] (Severity 0)

What happens if the user puts in a paycode that isn't their own? Whether on purpose because the kids got a hold of mom's phone, or on accident, what prevents users from seeing other's receipts? Does it matter?

29. [H2 Match between system and the real world] (Severity 0)

The time showed up on the receipt in 24 hour time. Will all users be comfortable with this? Will they be more comfortable with 12 hour time because that's probably what they are used to? Is there any reason why it's in 24 hour time?

30. [H3 User control and freedom] (Severity 2)

What if someone owes \$13 but they only have \$15 on them in cash. Should there be a way to account for this? Should the user have to figure this out?

31. [H3 User control and freedom] (Severity 1)

Why isn't there a Back button at the end? I understand that maybe after doing a receipt I don't need to enter another one, but if there is I don't want to have to go all the way out of the app and then back in.

Observation – If I first decide I want to split the bill evenly and then I wanted to divide by items, it's not so bad to go back to the other one. I just have to hit back a few times.

32. [H1 Visibility of system status] (Severity 1)

I wanted to view who was paying for what items all on one screen at the end. It would be nice to support the final output (individualized prices) with individualized receipts, or a single receipt broken down by payer.

33. [H3 Error Prevention] (Severity 2)

After selecting which customers to split unclaimed items with, it immediately goes back to the previous screen. In the screen where you select which customers to split items, it isn't super visible which ones you're picking out of the group. The lack of visibility and no way to confirm your choices might result in errors (selecting an extra person unintentionally and not noticing).

Appendices

James Getzendanner

1. [H2 Match between system and the real world] (Severity 2)

Upon entering my paycode into the device, I hit backspace instead of return because I expected return to be the bottom-right button as it is on most other devices (e.g. computer numpad, ATM PIN pad). I don't have an iDevice, but I assume you put it here for consistency [H4] because the device normally takes numeric input like that. If that's the case, you should probably stick with consistency and blame Apple =).

2. [H7 Flexibility and efficiency of use] (Severity 1)

I had to press Next on screen after pressing return to confirm entry of my pay code. Since there is only one way to proceed from this first screen, and I just pressed a button confirming my entry of the pay code, why not just take me to the next screen?

3. [H9 Help users recognize, diagnose, and recover from errors] (Severity 1)

The "Receipt Confirmation" screen asks a rhetorical question, "Is this your receipt?" The navigation buttons below seem to answer this question, but not with "yes" or "no" as I would expect. It looks to me like the right-hand buttons are the "yes" options, and the left-hand is the "no" option.

4. [H7 Flexibility and efficiency of use] (Severity 3)

On the "Split all items evenly" screen, it is difficult to specify any particular amount with the horizontal slider. For example, I'd like to be able to slide it so that my total is \$68.00 (just over a 15% tip), but with a mouse I can't get any closer than \$67.92 or \$68.10. With a finger on a touch screen, I think it would be much harder, and the resolution of the widget would still keep me from getting to the number I want. Providing for the slider to snap to certain values, like 15.00% tip, or \$68.00 total price, would help a lot, and reducing the default range of the slider would make it easier on my clumsy fingers. Come to think of it though, is a continuous slider really even necessary here? Maybe a selection of suggested tip values would work better, since I don't usually want the flexibility to tip any precise amount in the 0%-30% range. Finally, if there was a way I could simply punch on number keys to specify the amount of my tip or the total I desired, I could not find it.

5. [H7 Flexibility and efficiency of use] (Severity 2)

On the "Split all items evenly" screen, I tried to click/tap the # of Customers wheel at the top and bottom to change its value instead of dragging it. Again, I don't own an iDevice, so perhaps this widget is familiar to those who do, but it wasn't immediately obvious to me.

Dragging is cool I guess, but I would consider simple increment/decrement buttons for a small integer variable like this.

6. [Bug] (Severity 1)

Tip and Total on the "Bill Confirmation" screen don't reflect the tip I just entered, but the individualized totals do.

7. [H7 Flexibility and efficiency of use] (Severity 3)

I found several things on "Split Meal by Items" cumbersome. First, the mechanism for editing the customer list is way more trouble than I would ever be inclined to go through at a restaurant after eating. To me, guest names are not nearly important enough to justify typing them in on that tiny little keyboard. I think you can make two assumptions and clean up this screen a lot. First, leave the customers anonymous, and identify them automatically by number, color, letter, pseudonym (Alice, Bob, etc.), or the like. Second, require the user to set up the customer list before dividing items up. If you do this, you can remove the confirmation dialog on addition/deletion of a guest, and more generally reduce the task of enumerating guests to that of specifying a small integer number of them.

8. [H4 Consistency and standards] (Severity 2)

In its current manifestation, the "Edit Customer List" screen uses two different types of buttons to add and remove guests. I like the X buttons well enough, but there's no + button to go with them, so it takes me a while to read the text on the other buttons and find "Add Customer".

9. [H7 Flexibility and efficiency of use] (Severity 2)

On the "Split Meal by Items" screen, it was again not obvious to me that dragging scrolls the list of receipt entries. Some kind of visual cue would go a long way, I think, although iPhone owners may already be trained to drag first and ask questions later. Also, while trying to drag, I repeatedly accidentally clicked/tapped an item, taking me somewhere I didn't want to be.

George Harris

1. [H4 Consistency and Standards] (Severity 1)

The numeric keypad is not of a similar appearance to the one normally used by iPhone applications, and is initially awkward.

2. [H1 Visibility of System Status] (Severity 2)

When entering the Paycode, the system appears to be adding a space after each digit. This space disappears when the next digit is entered and the delete key properly removes the last digit, but upon adding a digit the cursor is positioned as if a space was also added.

3. [H1 Visibility of System Status] (Severity 2)

The system does not provide positive feedback when a valid receipt code is entered.

4. [H1 Visibility of System Status] (Severity 3)

When the amount of the tip displayed on the tip slider exceeds \$9.99, not all of it is visible on the slider. In combination with problems 4 and 5, this makes it difficult to ascertain the current value of the tip.

5. [H1 Visibility of System Status] (Severity 3)

The tip percentage displayed below the tip slider is obscured by the user's finger and is not visible at any time while the slider is in use.

6. [H1 Visibility of System Status] (Severity 3)
At times the subtotal, tip, and total shown on the "Adding in Tip" screen are obscured by the user's hand or finger, making them difficult to see.
7. [H1 Visibility of System Status] (Severity 2)
The system does not provide positive feedback when the paycode entered is recognized. It is unclear that pressing the 'next' button will provide this feedback.
8. [H3 User Control and Freedom] (Severity 3)
It is not possible to set the tip slider to a round dollar number. If the user wishes to do so they are unable.
9. [H1 Visibility of System Status] (Severity 3)
While adjusting the tip slider, it is possible to move the marker to values that do not exactly correspond to a round percentage. Although it appears possible to set the tip to these values, the slider immediately snaps to the nearest value corresponding to a round percentage when the user stops adjusting the slider.
10. [H1 Visibility of System Status] (Severity 3)
Tapping "Select All" on the "Split Unclaimed Items" screen provides no feedback. It is not clear what the result of pressing the button is, and it appears as though the system has done nothing.
11. [H1 Visibility of System Status] (Severity 3)
Tapping the name of a guest on the "Split Unclaimed Items" screen provides no feedback. It is not clear what the result of pressing guest's name is, and it appears as though the system has done nothing.
12. [H4 Consistency and Standards] (Severity 2)
The totals for each guest on the "Bill Confirmation" screen do not reflect each guest's share of the tip.
13. [H4 Consistency and Standards] (Severity 2)
The keyboard used for guest name entry differs from the standard iPhone keyboard used in all other iPhone apps, making it initially awkward to use.
14. [H7 Flexibility and Efficiency of Use] (Severity 3)
Changing guest names is slow enough of a process that I didn't want to take the time to do it, but something that would have been very helpful in splitting up the bill.
15. [H4 Consistency and Standards] (Severity 2)
Guest names can be changed when splitting the bill by item, but not when splitting the bill evenly.
16. [H4 Consistency and Standards] (Severity 1)
Tapping the name of a guest while splitting the bill by item gives feedback that seems to indicate something has happened when nothing has.
17. [H4 Consistency and Standards] (Severity 3)
The "Split Unclaimed Items" screen does not provide a "confirm" button, instead using the "Back" button for that purpose. On all other screens this button takes you to the last screen without saving your state whereas here it is used to apply changes. The lack of an explicit confirmation button is confusing.

18. [H5 Error Prevention] (Severity 3)

The function of the "Split Unclaimed Items" is initially unclear. While it is obvious what selecting particular items on the screen does with some experimentation, it is easy to incorrectly split items on first use, requiring the user to either start over or manually remove guests from individual items.

Katherine Murphy

Problem 1 [H5] (Severity 0)

What happens if the user puts in a paycode that isn't their own? Whether on purpose because the kids got a hold of mom's phone, or on accident, what prevents users from seeing other's receipts? Does it matter?

Problem 2 [H2] (Severity 0)

The time showed up on the receipt in 24 hour time. Will all users be comfortable with this? Will they be more comfortable with 12 hour time because that's probably what they are used to? Is there any reason why it's in 24 hour time?

Problem 3 [H6] (Severity 1)

Rounding up. I do it to all the receipts I receive while paying for food. Why doesn't the phone provide a "rounding up" option, or just does it? I don't really want to pay \$12.94. But if someone else is paying \$14.44, do I round up or down? I want to see options for that, and I don't want to piss off my friends.

Problem 4 [H3] (Severity 2)

What if someone owes \$13 but they only have \$15 on them in cash. Should there be a way to account for this? Should the user have to figure this out?

Problem 5 [H7] (Severity 1)

Do I have to deal with cents? I don't like dealing with cents. What if someone in my group follows this app religiously and I can't pay my cents? Can we just drop the cents to make life easier? Even if it means I pay 46 cents more...

Problem 6 [H3] (Severity 1)

Back button at the end, why isn't there one? I understand that maybe after doing a receipt I don't need to enter another one, but if there is I don't want to have to go all the way out of the app and then back in.

Observation – If I first decide I want to split the bill evenly and then I wanted to divide by items, it's not so bad to go back to the other one. I just have to do it back a few times.

Problem 7 [H1] (Severity 1)

What confused me was when I split the bill by items and then I told it to split up the remaining items, the beer box ended up with six icons in it. Did the other users pay for a part of the beer as well? Because two users were in it twice, does that just mean they cancel out the other users? I didn't understand what was happening here.

Problem 8 [H7] (Severity 4)

When I had to give each person their own meal and drink, it frustrated me. First I had to find the meal, and then the drink, and drag the right icon to it... eight times! Couldn't there be a screen that asks, "Albert got:" and then I pick from a list of items on the receipt. Maybe add another little check box that is for "This is the only person paying for this item"

so it is removed from the list and the list gets smaller. The boxes and the icons aren't intuitive or quick and efficient.

Problem 9 [H1] (Severity 1)

If I wanted to view who was paying for what items all on one screen, would that be possible to do? Or just too confusing cause the screen where you drag people to items is kind of like that anyway.

Overall this app is very well done. I enjoyed using it and would probably use it in the future if it were to come out. I've always been a fan of just throwing in more money that I need to just so people don't have to argue about who's going to put in the extra 30 cents that we're missing.

Another issue that I'm not quite sure how to address, is for large dinners, for a birthday or so, when the bill gets rather pricy, some people try to skimp out on paying, not on purpose, but because they don't believe they owe that much. They'll purposefully round their amount down, or only contribute a 20 when they really owe 35 and think that that's acceptable. Your app doesn't really address if there's a lack of money being thrown into the pot, and who's to blame for the slack.

The confirmation screen is great cause one could say "Look! Ipayr says you owe \$14.95, so just give me \$15." But if the guest starts to question the app, maybe it should give a screen breakdown of the items that user has. Maybe by clicking their name on the confirmation page? Just for that extra amount of evidence.

Melissa Yu

1. [H2 Match between system and the real world] (Severity 3)

Having to drag the customer to the food is confusing. Dragging the food to the customer is more intuitive. The way I see it, people will tend to think "this food is mine/yours/his" and drag the food TO the person, not the other way around. On your site, you say "drag food to people" but your prototype does otherwise, so I'm not sure which one you mean to do.

2. [H4 Consistency and standards] (Severity 2.5)

In the "split unclaimed items" window after clicking the button, there is no clear "OK, I am confirming this is what I want" button. Instead there is only a "back" button, which has the function of a "back/cancel" button and a "confirm" button, which could be confusing.

3. [H3 Error Prevention] (Severity 2)

After selecting which customers to split unclaimed items with, it immediately goes back to the previous screen. In the screen where you select which customers to split items, it isn't super visible which ones you're picking out of the group. The lack of visibility and no way to confirm your choices might result in errors (selecting an extra person unintentionally and not noticing).

4. [H7 Flexibility and efficiency of use] (Severity 2)

The scrolling mechanism for the row of food items is somewhat inefficient. Scrolling only a few items at a time (since the food item buttons should be large enough to be easily visible) is inefficient and would get repetitive if you had a lot of different items. That combined with having to drag customer to food (if that is the case) would force users to go through the food items one by one, rather than by customer.

5. [H3 Error Prevention] (Severity 2)

The action of scrolling by dragging over the food items can also result in accidentally

clicking it instead, taking you to the food details page instead.

6. [H2 Match between system and the real world] (Severity 2)

Using a continuous vertical scrolling mechanism to choose a discrete number of customers when evenly splitting the bill doesn't match the way people think. You can't have fractions of people, why give the choice?

7. [H7 Flexibility and efficiency of use] (Severity 2)

Similar to #4, the vertical scrolling mechanism when choosing the number of customers to split the bill isn't the most efficient option. Something for selecting discrete options might be better.