# Heuristic Evaluation of H$_2$O

## *1. Problem*

As it stands, very few people have systems in place in order to track their water usage. H$_2$OW Low proposes a comprehensive, in-residence system that 1) automatically tracks water use and sends data to the app, 2) allows users to set personal and residence goals, and 3) allows users to see their performance compared to that of others.

## *2. Violations Found*

### 1. [H2-1: Visibility of Status] [Severity 4] [Found by: A, B, C]

Home screen is minimalist in design, but the bubble interface for current usage is non-intuitive. It is not immediately clear the time span that the average or best score cover, are these daily or monthly tabulations? The write-up states that the bubble pops after the average amount has been met, what is the behavior of the interface after popping? Does the system give warning messages that ping users about their current usage? All of these relate to the visibility of the system status.

### 2. [H2-5: Error Prevention] [Severity 3] [Found by: A C]

There is a leak in the toilet, but the app has no alert messaging system to help the user rectify this critical error. Additionally, the information that the washing machine is old is not very salient, and the messages here are unclear. Users have to go check their appliances in order to get this information.

### 3. [H2-4: Consistency] [Severity 3] [Found by A B C]

In the friends menu, there is no option to deny Alex White as a friend, and it is also difficult to tell that he has a pending friend request (this is what I am assuming). The app need to partition an "outstanding requests" field from the friends menu in order to make this information more salient to the user, this is typical on many online platforms.

### 4. [H2-7: Flexibility and Efficiency] [Severity 4] [Found by A B C]

Presumably, the margin for usage is roughly one order of magnitude between the most inefficient and the most efficient users. The bubble comparison design makes it difficult to see which friends are actually using the least amount. Generally, the size of the bubbles is difficult to compare, even in a non-exact sense. The app uses concentric circles to show the current, best and average water use. The circle for current is the smallest, while for best is bigger in diameter. This is against the normal convention that bigger circle signifies larger amount. Use standard convention by flipping the order so that best is the smallest circle. Perhaps a "top friends" screen would be useful here, which could incorporate elements of public shaming, for instance. This issue makes it difficult to complete task 2 in an effective manner, especially if there are a large number of friends (too many bubbles to fit on the screen).

### 5. [H2-8: Minimalist Design] [Severity 1] [Found by C]

The colors for comparison between my profile and that of Andrew Johnson are very similar, and the bar graph is difficult to parse as a result.

6. [H2-4: Consistency] [Severity 1] [Found by C]
The name of the app is not always present, so the user doesn't have a constant reminder of the app name. From a branding perspective, it may be useful to have the app name more salient. This is common practice.

7. [H2-6: Recognition not Recall] [Severity 3] [Found by A B C]
The "top friends" section under each appliance is unclear. Is this a ranking of the people who have used the least amount, or those who have used the most?. Maybe providing a "usage amount" in gallons for the time period could resolve this issue.

8. [H2-10: Documentation] [Severity 4] [Found by A B C]
No "help" menu is available.

9. [H2-1 Visibility of System status] [Severity 3] [Found by A B]
In the friends section, the screen displays water use of various friends in bubbles, but there is no indication of which bubble belongs to which friend. This is really confusing. To fix this, add the friends' names right under their bubble.

10. [H2-6 Recognition rather than recall] [Severity 3] [Found by A B]
On clicking the name of a friend to compare water use, the column chart doesn't show any labels on axis to indicate what amount of water in gallons does each bar correspond to. Thus, it requires a person to recall his water use numbers for various purposes to get a meaningful comparison.

11. [H2-2 Match between system and the real world] [Severity 2] [Found by A]
After clicking on Laundry machine in my usage, the tip section says "laundry machine is not energy efficient. Buy a new one to save 10 gal/load". Energy efficient, in common use generally refers to electricity usage, thus this might confuse a customer. To fix this, change the wording to "water efficient" or just "efficient".

12. [H2-3 User Control and Freedom] [Severity 2] [Found by A]
While comparing water use to a friend, if the user clicks on an icon like shower, washer, faucet – it takes the user to my usage page for that device. There is no way to go back to the comparison chart except having to manually go to Friends and click on that particular friend's name. Consider adding a back button to increase user's freedom of navigation.

13. [H2-4 Consistency and standards] [Severity 4] [Found by A]
There is no obvious distinction between a button and a non-clickable symbol. On the Friends page, the symbols for washer, shower etc. are clickable but the exact same symbols on the landing page can't be clicked. Consider adding a distinction to differentiate an Action button from a symbol.

14. [H2-7 Flexibility and efficiency of use] [Severity 2] [Found by A]
If a user wants to make a quick comparison with his best friend or a subset of friends, there is no way of accelerating the task. The user would have to still go to friends and manually select the name from the list to compare. Consider adding a "Favorite friends" section to the friends' comparison page.

15. [H2-3: User Control] [Severity 2] [Found by B]
For the competitions, you can only accept or decline the invitation; there is no way to put it off until later. Consider adding this option in the menu bar.

## 3. Summary of Violations

| Category | # Viol. (sev 0) | # Viol. (sev 1) | # Viol. (sev 2) | # Viol. (sev 3) | # Viol. (sev 4) | # Viol. (total) |
|---|---|---|---|---|---|---|
| [H2-1: Visibility of Status] | | | | 1 | 1 | 2 |
| [H2-2: Match Sys & World] | | | 1 | | | 1 |
| [H2-3: User Control] | | | 2 | | | 2 |
| [H2-4: Consistency] | | 1 | | 1 | 1 | 3 |
| [H2-5: Error Prevention] | | | | 1 | | 1 |
| [H2-6: Recognition not Recall] | | | | 2 | | 2 |
| [H2-7: Efficiency of Use] | | | 1 | | 1 | 2 |
| [H2-8: Minimalist Design] | | 1 | | | | 1 |
| [H2-9: Help Users with Errors] | | | | | | |
| [H2-10: Documentation] | | | | | 1 | 1 |
| **Total Violations by Severity** | | | | | | 15 |
| Note: check your answer for the green box by making sure the sum of the last column is equal to the sum of the last row (not including the green box) | | | | | | |

## 4 Evaluation Statistics

| severity\evaluator | evaluator A | evaluator B | evaluator C | evaluator D | evaluator E |
|---|---|---|---|---|---|
| level 0 | | | | | |
| level 1 | | | 25.00% | | |
| level 2 | 25.00% | 12.50% | | | |
| level 3 | 41.66% | 50.00% | 37.50% | | |
| level 4 | 33.33% | 37.50% | 37.50% | | |
| total (levels 3 & 4) | 8 | 7 | 6 | | |
| total (all levels) | 12 | 8 | 8 | | |

| evaluator # Ex. C | # problems found Ex. 7 | # problems remaining & problem IDs Ex: 5 (1, 7, 11, 13, 17) |
|---|---|---|
| A | 12 | 3 (5,6,15) |
| B | 8 | 7 (2, 5, 6, 11, 12, 13, 14) |
| C | 8 | 7(9, 10, 11, 12, 13, 14, 15) |
| | | |
| | | |

Right right-click on the chart and select "Edit Data…"
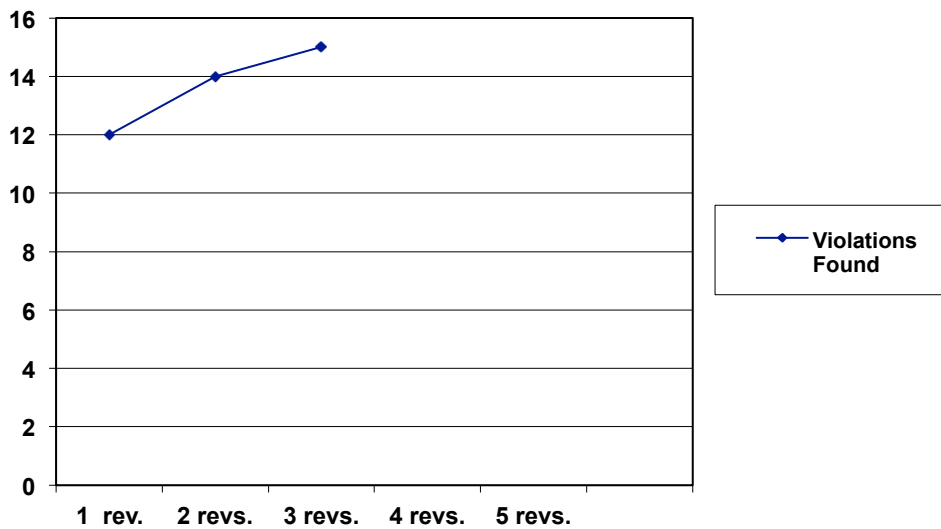
## *Severity Ratings*

0 - don't agree that this is a usability problem
1 - cosmetic problem
2 - minor usability problem
3 - major usability problem; important to fix
4 - usability catastrophe; imperative to fix

## *Heuristics*

**[H2-1: Visibility of System Status]**
- keep users informed about what is going on

**[H2-2: Match Between System & Real World]**
- speak the users' language
- follow real world conventions

**[H2-3: User Control & Freedom]**
- "exits" for mistaken choices, undo, redo
- don't force down fixed paths

**[H2-4: Consistency & Standards]**

**[H2-5: Error Prevention]**

**[H2-6: Recognition Rather Than Recall]**
- make objects, actions, options, & directions visible or easily retrievable

**[H2-7: Flexibility & Efficiency of Use]**
- accelerators for experts (e.g., gestures, kb shortcuts)
- allow users to tailor frequent actions (e.g., macros)

**[H2-8: Aesthetic & Minimalist Design]**
- no irrelevant information in dialogues

**[H2-9: Help Users Recognize, Diagnose, & Recover from Errors]**
- error messages in plain language
- precisely indicate the problem
- constructively suggest a solution

**[H2-10: Help & Documentation]**
- easy to search
- focused on the user's task
- list concrete steps to carry out
- not too large

Additional Individual Evaluation from Absent Student:

**Problem**
How to effectively track water usage in order to more efficiently conserve water.
**Violation's Found**
1. **[H2-4 Consistency & Standards]**
   The interface on the friends screen presents bubbles for the numerous different friends of the user, and upon clicking on the users name brings up a more detailed comparison. Yet, when clicking on the bubble, this does not pull up the same information.
2. **[H2-3 User control and Freedom]**
   The interface on the friends screen merely shows the list of friends without a search bar, thus the user is forced to manually scroll through in order to find the friend they are searching for.
3. **[H2-6 Recognition rather than Recall]**
   When clicking for a more in depth look at a certain appliance's usage, the app brings up a graph. Yet, this graph does not show the usage level nor the time frame, thus the user merely is looking at a line with no indication as to the information that it is displaying.
4. **[H2-10 Help and Documentation]**
   While there is an "about" section, there is no help section to help users with how to use the app or what to do should they encounter problems/

**Summary of Violations**

| Principle | # of violations |
|-----------|-----------------|
| H2-1 | 0 |
| H2-2 | 0 |
| H2-3 | 1 |
| H2-4 | 1 |
| H2-5 | 0 |
| H2-6 | 1 |
| H2-7 | 0 |
| H2-8 | 0 |
| H2-9 | 0 |
| H2-10 | 1 |

**Recommendations**
Overall I found the prototype to be rather well constructed. There weren't too many instances where I was unsure of what something did or what something meant (all instances are already discussed above). As for the violations of the principles, they are minor and can be easily fixed. Adding a search bar to the friends list, labeling the graphs with markers to indicate the values, and possible incorporating a "help" function are really the only problems that stand out. As for problems that fit outside of the principles, I was a little confused as to what the community challenges was attempting to do, yet this is merely a prototype so it is impossible to get the full scope of a fully integrated social function such as that one.