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Destructive Feedback: a user created strategy for collecting user feedback in shared systems

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Abstract

This paper documents a method for collecting user feedback on broken or malfunctioning devices dubbed *Destructive Feedback*; where the user deliberately "breaks" the device by removing an affordance. This makes it easier to detect visually and with sensors, as well as discourages others from using a broken device. This method is inspired by turning the bike seats around in the Paris bike share system (Vélib'). A designer lead application of *Destructive Feedback* would allow for easier detection of faults by users, repair personnel, and the system itself. First, it is unclear how widely used and understood the behavior is in the Vélib' system; pointing to the need for an ethnographic study. If the benefits in this real example are significant, the main challenge of such a system is to create "destruction" in an easily repairable way, inform users of the meaning of the destruction, and prevent miss-use. Finally,it will be necessary to test example devices with users to gauge feedback, work with engineers to create sturdy "breakable" systems, and compile these findings into a set of design tools and methods that allow designers to implement *destructive feedback* in other PSS'.

Keywords

Shape changing interfaces, Internet of things,

1. Introduction and Inspiration

This paper presents the concept of *Destructive Feedback*, a method of user feedback where users are encouraged to "break" devices to report and share the fault. This method is inspired by (if not just a documentation of) behavior users of the bike sharing system of Paris, Vélib'; users sometimes turn the seat of these bikes around in order to indicate to other users and repair personnel that the bike is faulty (see the two bicycles in Figure 1 for an example where the fault is also clearly visible).

This (seemingly) user-created mechanism for sharing feedback (see Section 4) adds value for users of the bike share system (who are less likely to use a broken bike), repair personnel (bikes with issues easier to spot), and the system (benefitting from better user experience and more accurate maintenance). This paper tackles four main questions about this method: What is *Destructive Feedback* in a design context? What are the benefits and drawbacks of such a system? Do we know if users actually use this? What design guidelines and methods are necessary to develop such tools?

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Figure 1: Two Vélib' bicycles, both have their seat turned to indicate they are broken. The chain of the closest one is drooping, which is an additional indicator for those familiar with bicycles.

2. Designerly Definition

As shown in Figure 1, the seats of the bike have been turned around as an indication that they are not working. On one level, this acts as a visual indicator that there is something "different" with the bikes. On a more pedantic, designer level, the feedback removes the affordance of being able to sit on the bike normally. This acts as a (un)conscious disincentive to use the bike, reducing the likelihood that the user uses a bike that is damaged. This "removal of affordance" process is referred to as "Destructive Feedback" in order to provide a term that is less dependent on jargon and more provocative.

3. Benefits and Drawbacks

The main benefit of this system has been highlighted above: an obvious indicator of fault in the service. For Vélib' specifically, integrating the feedback mechanism into the bike itself, there could be an increase in the number and accuracy of user reports, which can be difficult to collect and are understudied [1, 2, 3]. Furthermore, the act of destruction that is inherent in this process can be a method of catharsis for the user and bring a moment of joy [4] increasing the user experience in the face of faults.

Of particular interest would be a benefit not implemented by Vélib', the fact that these large, deliberate actions of "breaking" a component would most likely lend themselves well to being

detected by IoT sensors. To detect the fault shown in Figure 1 without detecting *destructive feedback*; each bike would need to be equipped with tire pressure sensors, a chain sensor, as well as a host of other sensors to detect small faults such as break pad wear (measured in tenths of millimeters), all of which would require connectivity and power. Thus, *destructive feedback* would combine the amazing ability of humans to detect errors with the benefits of (simple) IoT sensors.

In addition to the clear and less clear benefits, there are drawbacks to such a system. Mainly, that designing a system to be "breakable" could increase the chance that such a system breaks, because the design must deliberately include a broken state. Additionally, vandalism and theft is a major issue with micro-mobility (and other types of products) [5], giving vandals additional ways to mess with a system by design could lead to increased vandalism. Finally, there is the fact that users will need to be aware of the possibility to give this kind of *destructive feedback*, and interpret what it means. Given the number of websites (see Appendix A) explaining the backward seat of a Vélib', the removal of an affordance might not be enough to give users a clear idea of what is happening.

Given these drawback, the question becomes: when do the benefits outweigh the drawbacks and how can a system be designed to reduce these drawbacks?

4. Validation: Vélib'

It would be simple to begin to validate these proposed benefits and drawbacks using the real world example of the Vélib' bike-share system[1] in Paris. Unfortunately most methods would require a level of physical access and French language knowledge not available to the author at this time. Both observation and user interviews would be useful in answering a smattering of questions from both the user and service perspectives, such as:

1. Do users actually apply Destructive Feedback?
2. Do users actually understand Destructive Feedback?
3. How do users actually discover Destructive Feedback?
4. Do repair personnel understand Destructive Feedback?
5. How reliable for the repair personnel is Destructive Feedback?

4.1. User Perspective

There are 1400 Vélib' stations in Paris [2] offering ample opportunities for researchers to observe the flow of users (given ethics and privacy approval) and their behavior, specifically monitoring their use of and reaction to backward seats. Additionally, researchers could conduct brief interviews with users in order to gauge their understanding of and history with the system and the backward bike seats.

[1] Vélib' itself does not mention the backwards bike seats in any official capacity, however a similar bike service in Montréal officially suggests turning the seat around, but also has a report button on the bikes: https://www.youtube.com/watch?v=16DAn0EdoLw

[2] Reported on https://www.velib-metropole.fr/en/service, accessed November 1st, 2022

Researchers *could* "force" user interaction with Destructive Feedback. For example by turning all of the seats in on station backwards and noting how this changes the behavior and experience of users. This will definitely require careful consideration of the moral and ethical aspects of potentially preventing users from accessing bikes.

4.2. Service Perspective

As noted previously, a benefit of the Destructive Feedback method is that user-detected faults are easier for the service to detect. However, there is no clear documentation of how Vélib' personnel respond to users' Destructive Feedback. As a starting point, interviews with repair personnel could inquire into their experience and understanding of the backward seats. Observing personnel, either at a distance or as a ride-a-long, would help further illustrate their behavior in response to the Destructive Feedback. Finally, measuring the effectiveness of Destructive Feedback could involve noting the position of the seat of bikes brought in for repair, which would help calculate the number of total faults reported through Destructive Feedback, and the reliability of the method (the ratio of reported repairs to actual repairs).

5. Design Guidelines and how to Create Them

In order to apply the concept of destructive feedback to other products and contexts it is essential to create a set of design guidelines that not only help designers select a mechanism to integrate destructive feedback, but do so while being aware of the context, user behavior, potential downsides, and the impact it has on the service as a whole (elements such as repair personnel).

One approach for generating such design guidelines would be as follows:

First, research the true benefits of *destructive feedback*, starting with the approach mentioned in Section 4. In addition, there are examples of similar behavior (both of users and products) in contexts outside of shared bikes. Simple examples include turning empty champagne bottles upside down or removing the affordance of being able to look at a broken screen by tapping a piece of paper in front of it. Additional examples should be sought out, researched, and mapped out to provide more information on when and how users develop and apply Destructive Feedback.

Following the initial research, the preliminary findings can be used to drive a series of small research pilots where designers target specific examples of destructive feedback designs in order to understand the decision factors that come up during such a design process, and then combine that with information from user behavior from these initial tests.

These findings can then be combined to form elements of a design tool (activities, segmentation, path, and examples [6]) that will enable designers to analyze the possible uses of destructive feedback in their situation and give them the tools necessary to think through those ideas. By approaching the development of the design tool using an iterative prototyping process many of the elements of the tool (such as activities and examples) can be generated and validated simultaneously.

As can be surmised by this paper, there is currently a lot to explore in this direction: from the impact of it on user experience, to finding it in other contexts, to figuring out how to incorporate it to design processes.

A. Websites

The following is a (incomplete) list of websites that mention the meaning of the backwards bike seat. All were accessed November 1st, 2022.

- https://secretsofparis.com/practical/using-the-velib-bike-service-in-paris/
- https://www.tripadvisor.com/ShowTopic-g187147-i14-k7549333-Velib_Bike_Rental_Warning-Paris_Ile_de_France.html
- https://thegoodlifefrance.com/how-to-take-a-velib-bike-ride-in-paris/
- https://sarahlynnpablo.wordpress.com/2012/09/21/what-you-need-to-know-about-velib-paris-public-bike-share/

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[3] L. Lou, L. Li, S.-B. Yang, J. Koh, Promoting User Participation of Shared Mobility in the Sharing Economy: Evidence from Chinese Bike Sharing Services, Sustainability 13 (2021) 1533. URL: https://www.mdpi.com/2071-1050/13/3/1533. doi:10.3390/su13031533, number: 3 Publisher: Multidisciplinary Digital Publishing Institute.

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[5] A. Agnihotri, S. Bhattacharya, Bird's Micro-Mobility Solution: The Changing Landscape of Urban Transportation, London, 2021. URL: https://sk.sagepub.com/cases/bird-micro-mobility-solution-landscape-urban-transportation. doi:10.4135/9781529764215.

[6] W. Meijer, XXR: Further Extending Extended Reality with Sensory Perception (2019). URL: https://repository.tudelft.nl/islandora/object/uuid%3Aa42d4a2d-9589-4e0e-95aa-a33623361b3c.