

Discoverability Improvements in the Interface of GoPro Action Cameras

Pietro Cau

pietro.cau@studenti.unitn.it

Department of Psychology and Cognitive Sciences
University of Trento
Rovereto, Italy

1 Introduction

The goal of this study is to validate a proposed modification to the user interface of GoPro Action Cameras. The modification aims to improve discoverability in a specific task with minimal changes to the UI.

The task we aim to improve involves finding and opening the video gallery, where users can play back previously recorded videos. This may seem like a minor task, but it is an important feature of the camera.

Currently, when the user is in the “main screen” (Figure 1), the video gallery can be opened with a swipe up gesture. By doing so, the user will see the video gallery appear from below and slide up to fill the screen. There, the user can play previously recorded videos. To close the video gallery and go back to the main screen a swipe down gesture is used.



Figure 1. The “main screen” of a GoPro Hero action camera.

However, although the main screen affords this swiping gesture to open the video gallery, there is no element that indicates “swiping up” as a possible way of interacting with the device: i.e. it lacks a signifier.

Signifiers, as described by Don Norman in his book *The Design of Everyday Things* [3] are “any mark or sound, any perceivable indicator that communicates appropriate behavior to a person. [...] Signifiers signal things, in particular what actions are possible and how they should be done”.

The lack of a signifier conveying to the user the possibility of swiping up on the main screen to open the video gallery,

could result in confusion as to how perform the task. In listing the disadvantages of using contextual swipes, the Nielsen-Norman Group mentions that “[The] Lack of signifiers makes it unclear where the contextual swipe can be used.” [2].

Therefore, an alternative version of the interface was created by selecting an appropriate signifier to communicate the presence of the swiping affordance.

Then the two interfaces were tested against each other to see if the addition of the affordance has a significant effect in improving task performance.

2 Study Design and Methods

The study follows a between subjects design, with a control group performing the task on the standard, currently adopted interface, and a manipulation group performing the task on the modified interface.

2.1 Hypotheses

The following hypotheses are made:

- H1. The task completion rate for the manipulation group will be significantly higher than that of the control group.
- H2. The average time on task for the manipulation group will be significantly lower than that of the control group.
- H3. The average SEQ score for the manipulation group will be significantly lower than that of the control group.

2.2 The Two Interfaces

2.2.1 Current Interface. Figure 2 shows a digital mockup of the current interface of the GoPro Action camera, in this main screen a number of options and settings are shown to the user, and are accessible through different buttons.

In order to open up the video gallery the user is supposed to swipe up with his fingers. This however is not immediately apparent, as there is no element that indicates the possibility to interact with the interface in such a way. The user would need to somehow already know that the video gallery is located “below” the main screen, and that through a swipe up gesture it’s possible to bring it up.

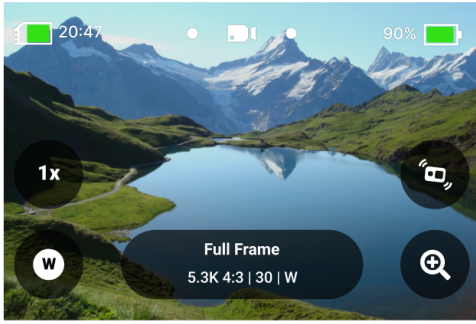


Figure 2. Digital mockup of current user interface

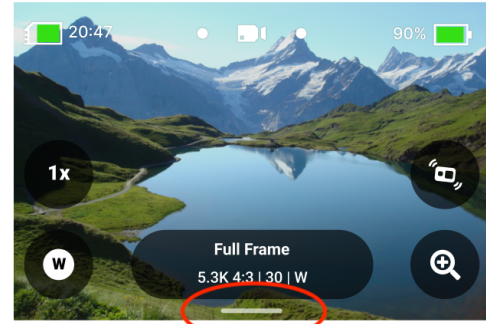


Figure 3. Digital mockup of modified user interface

2.2.2 Alternative Interface. In the creation of the alternative interface the goal was to produce minimal changes to the UI and functioning of the software, while still effectively conveying the presence of the “swipe up” affordance. The solution chosen was to add a subtle gesture indicator, in the form of a thin, pill-shaped bar at the bottom of the screen (See Figure 3). This slight modification to the main screen of the interface is all that changes from the control group to the manipulation group.

This specific visual element was chosen as it is already commonly used as a swipe or drag indicator in other interfaces. One of its most noteworthy appearances, is as part of Apple’s design language (see Figure 4). It’s widespread adoption in other interfaces means that users may already be familiar with it, and may already have a mental model that associates that shape in that context (close to the edge of a screen) with the possibility to drag or swipe.

It’s also worth noting that this visual element is also already present, with the same meaning, in the GoPro Hero’s interface, in fact, it is used in the video gallery to convey the possibility of swiping down to go back to the main screen (See Figure 5).

2.3 Methods

The study was conducted as an unmoderated usability test, administered through the Lyssna platform.

The participants were first briefed about the contents of the study and informed on how the collected data would be used. The study then begins by asking some questions about the participant’s experience with GoPro Action Cameras. Only data coming from participants that had little to no experience with GoPro Action Cameras was to be considered. This is because it is assumed that expert users will already know how to complete the task, and the data collected from them wouldn’t be informative to assess the discoverability of the

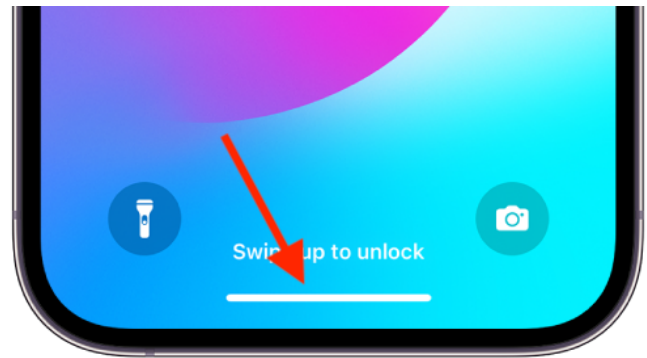


Figure 4. Use of the gesture indicator in an iPhone lockscreen



Figure 5. Use of the gesture indicator the GoPro Hero’s video gallery

interface.

Therefore through these questions, participants were screened to select only those that either had never used a GoPro, had used one a few times (less than 10) but a considerable amount

of time has passed since (more than one year) or had used older models of GoPro (Hero 6 or earlier), as those models have an older, different interface.

Another question asked is the participant's age, since it has been found to be a key moderator for digital literacy [1, 4]. This data could help answer questions about how different levels of digital literacy impact task performance, however in the present study not enough data was collected in order to make any meaningful analysis.

In the following section of the study the participants were presented with an interactive digital prototype of a GoPro Hero action camera on which to perform different tasks. Both a view of the touchscreen as well as a top view of the device are shown, in order to allow for interaction with physical buttons present on the top of the camera (See Figure 6).



Figure 6. Clickable digital prototype used in the study.

In the first task the participants were asked to record a video, by pressing the “record button” and then pressing it again to stop the recording. The purpose of this tasks wasn’t that of gathering performance data, instead, it was used to show the participant what happens when a video is recorded. In the existing interface when the user pushes the “record button” a second time to stop the recording, an animation shows the video “thumbnail” sliding down. This is an important clue for the user as to where the video gallery may be

Table 1. Task Completion

	Control Group	Manipulation Group
Completed	8	8
Not Completed	2	1

located, and as such, it was important to also present it to participants in the study, by recreating this interaction and the animation in the digital prototype.

The second task was the one where performance data was actually gathered. Participants were asked to open the video gallery and play the video they just recorded. Here for each participant we gathered objective measures of task performance, and subjective measures of perceived task difficulty. Performance Measures.

- Completion: Has the participant managed to successfully complete the task?
- Time on task: Time employed to complete the task.

Subjective Measures.

- SEQ: 7-point Likert scale, rating how difficult the the task was perceived to be.

2.4 Data Analysis

To test hypothesis H1 and H3 for significance, the group means were compared with a series of independent one-tailed t-tests. To test H2, a Chi-Squared test of independence was performed. All tests were performed with a significance level $\alpha = 0.05$ and to account for multiple hypothesis testing, p-values were adjusted with Bonferroni’s correction.

3 Results

24 participants took part in the study. 12 of them were assigned to the manipulation group, and 10 to the control group. Out of the 12 in the manipulation group, 10 were eligible to participants (based on their level on experience with GoPro action cameras, as described above). Out of the 10 in the control group, 9 were eligible to participate.

For all three hypothesis the results of the statistical tests came out as inconclusive ($p > 0.05$), so we are unable to say if the proposed interface is better, but looking at the data we can see that the two interfaces performed similarly, with no clear improvement in the alternative version.

As far as completion rates, the control group had a completion rate of 80%, while the manipulation group had a completion rate of 89%, so slightly better, but not enough to make the result statistically significant (Table 1).

As far as time on task, the averages for the control group and manipulation group are 36 seconds and 38 seconds respectively, by removing outliers (comprised by the participants who didn’t complete the task and spent a lot of time trying, up to two minutes) these figures go down to 26 and

28 seconds respectively. The numbers are again very similar, but although their difference isn't enough to make meaningful conclusions, their magnitude is: the fact that participants, on average, spent upwards of 25 seconds to understand how to open the video gallery is an indicator that neither of the two interfaces reaches a good standard of discoverability, and validates the necessity for the improved interface that is advocated for in this study.

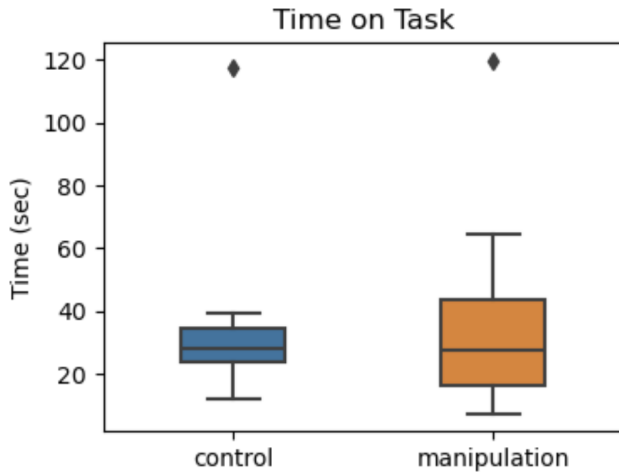


Figure 7. Time on task for the two groups

Finally, SEQ scores were also similar, with the control group averaging 5.1 and the manipulation group averaging 4.4. The difference is again, not statistically significant.

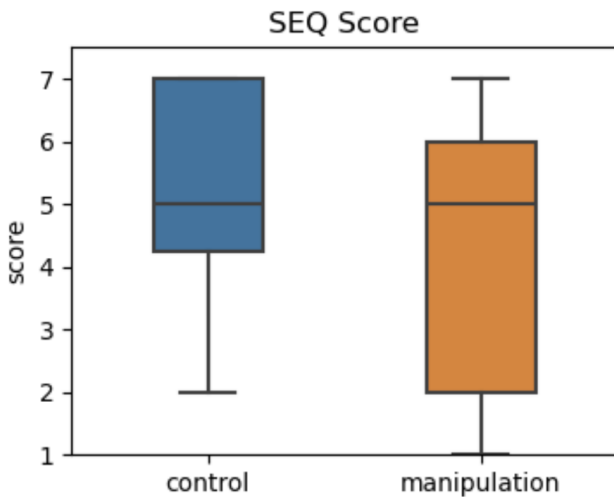


Figure 8. SEQ scores for the two groups

4 Discussion

While the UI of GoPro's action cameras lacks a signifier, it's hard to imagine that designers at GoPro are unaware of

the potential issues stemming from this. It is instead likely that their choice to design the interface in that way was intentional, and we can make educated guesses about why they made that choice.

Firstly, the touchscreen on a GoPro is rather small, and screen real estate comes at a price. Adding a visual signifier for the video gallery could take away some of that space from the main screen and add "visual clutter".

Secondly, the camera actually does tell you where the video gallery is, and how to bring it up. When the camera is turned on for the first time and the first video is recorded, a tooltip is shown to the user teaching them how to open the gallery (See Figure 9)



Figure 9. Tooltip shown to the user. Text reads: "Swipe up to see the photos and videos on your GoPro"

This solution can be effective as it informs the user unambiguously about how to perform the task, and one can assume that after a few times using the camera, the user will have learned this pattern of interaction and will not need a signifier to remind them how to open the gallery. However this will not work for users that don't get a brand new camera: if for example someone buys it used, as it is commonly happens, or just borrows it from a friend, they will not be presented with the tooltip, and may be unsure of how to perform the task.

Finally, the gesture indicator chosen for the alternative interface may be seen as "incorrect", as it is often used more as a "drag" indicator than a "swipe" indicator, and it is placed on the draggable element or window. In GoPro's design the "draggable" element, the one that is "moving", is the video gallery, not the main screen, so although the bar gesture indicator may be effective, it could be seen as inappropriate in that context.

In conclusion, this study doesn't manage to propose a valid solution to the problem, but does manage to confirm its existence and quantify its magnitude. A number of other

alternative interfaces are possible, and should be tested in future research.

References

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