**Paper 2: Can people benefit from keeping their screens darker?**

**Abstract**

We investigated whether the benefits of darkening the brightness of a smartphone could possibly exceed the inconvenience of using it. We took a questionnaire to students who usually use smartphones. We examined previous research on the relationship between smartphone screen brightness and charging.

We argued that darkening the screen of a smartphone wouldn't exceed the inconvenience. However, as a result, it turned out that people feel benefit which exceeds the inconvenience. from darkening the screen of their smartphones.

1. **Introduction**

Today, smartphones have become an essential part of our daily lives. If we could use our smartphones for longer amounts of time, our daily lives would be more comfortable. We took some questionnaires in order to get a general opinion about the relationship between smartphone screen brightness and charging.

When we asked “Do you think that turning your smartphone’s screen dark will make the battery last longer?”, about 85% people answered “Yes”. From this result, in general, we found that people believe making their smartphone screens darker can reduce the loss of charge. As shown in the results of the survey, there is a widespread view that keeping the screen of their smartphone dark can reduce the loss of charge.

However, it is also true that making the screen of a smartphone darker increases the inconvenience. We thought that using a smartphone with a bright screen would not make that much of a difference in the loss of charge compared to using a smartphone with a dark screen. In terms of charging, we thought that the benefits would not be enough to exceed the inconvenience of making the smartphone screen dark.

Certainly, making the screen darker may help reduce the loss of charge. However, it may not be much different from the case of using a bright screen. Therefore, we think that the benefits of making the screen darker do not so much exceed the inconvenience, and argue that there is not much value in making the screen darker.

Based on the results of questionnaires, previous research, and our own experiments, we finally came to the conclusion that people can benefit from keeping their screens darker. The process of coming to this conclusion is described below.

We think that this research could help make our daily lives somewhat more comfortable.

1. **Outline**

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1. **Research**

First, we asked some classmates, “When you switch your smartphone’s display from light to dark, do you think there are more advantage that battery is saved than disadvantage that dark display is uncomfortable?” （Q1）

Then, about 78% of classmates answered “No.”. This means that when they switch their smartphone’s display from light to dark, many people think the advantage that battery is saved is not better than the disadvantage that dark display is uncomfortable as we argued at first.

Second, we carried out experiment on smartphone’s battery. By this experiment, we tried to know how much of battery can be saved when we switch our smartphone’s display from light to dark. We adjusted our display brightness to maximum or minimum. Then we investigate how much of battery can be saved in each brightness when we use our smartphone for an hour. Furthermore, we use same application in the both brightness. The result is as follows.

Table1 How much of battery can be saved in each brightness when we use our smartphone for an hour?

|  |  |  |
| --- | --- | --- |
|  | **Max(100%)** | **Min(0%)** |
| **Daiki** | 34 | 12 |
| **Hitoshi** | 16 | 15 |
| **Kyoko** | 29 | 16 |

In addition to, we found an article about the relation between display brightness and the amount of battery that are saved. In the article, the writer carries out experiment. He adjusts his display brightness to 0%, 25%, 50%, 75% or 100% and he measure the time that battery is consumed 10%. The result is as follows.

Table2 The time that battery is consumed 10%

|  |  |
| --- | --- |
| **Display brightness** | **The time** |
| 0% | 61.00 |
| 25% | 58.33 |
| 50% | 45.42 |
| 75% | 34.23 |
| 100& | 25.45 |

Our experiment and the article we found prove the darker smartphone’s display is, the more battery is saved. Particularly, when the brightness is 0%, the time that battery is consumed is 2~3times longer than when the brightness is 100%.

Finally, we asked classmates who are asked Q1, “We have the data that when display brightness is minimum, the battery is saved 2~3times more than when display brightness is maximum. Then, do you switch the display to dark?” (Q2)

Then, about 85% of classmates answered “Yes.”. Many people tend to think the advantage that battery is saved is not better than the disadvantage that dark display is uncomfortable.

However, when the fact that when display brightness is minimum, the battery is saved 2~3times more than when display brightness is maximum is proved, people think there are more advantage than disadvantage. That is thing we found by asking Q2.

1. **Limitation**

For the future research, we can study two things. First, we can focus on the difference of the amount of battery consumed when we use different applications. Second, we can focus on the difference of the amount of battery consumed when we use different models of smartphone.

If we have more data, we could have more exact data than we had.

1. **Conclusion**

By these results of survey and experiments, we conclude when we switch our smartphone’s display to dark, we can save the battery of smartphone 2~3times as much as when we do not switch. And people can feel that the advantage that battery is saved is better than the disadvantage that dark display is uncomfortable. That’s why, to save smartphone’s battery, it is effective to switch its display to dark. So, we suggest to you put into action right now.

1. **Reference**

【iPhone実験】バッテリーの持ちと画面の明るさの関係https://www.google.com/amp/s/www.appbank.net/2016/11/30/iphone-news/1282879.php%3Famp%3D1