



Towards Designing Multi-Device Digital Self Control Tools

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Introduction

- ▶ Nowadays, people typically own more than one device (PC, smartphone, tablet, etc), and they often use them concurrently or sequentially.
- ▶ The multi-device ownership enhances the time and the frequency of technology usage, with related risks for *digital wellbeing*.
- ▶ Recent studies define *digital wellbeing* as a “degree to which users perceive their digital device usage to be well-aligned with personal, long-term goals”, suggesting that the self-control of the user over their devices is central to this topic.
- ▶ However, most of Digital Self-Control Tools (DSCTs) are typically developed just for a single device: we need to investigate digital wellbeing in a multi-device context.

1 - Digital Habits

Habits

A “habit” is a human behaviour with a high frequency, a high level of automaticity and a consistent link with the individual and social context that triggers the behaviour.

Habit formation

- ▶ Most of the studies related to digital wellbeing identify the habit formation approaches as crucial for long-time behaviour change.
- ▶ The most implemented features in DSCTs for mitigating bad habits and promoting the formation of new, positive habits, are time limits, launches limit and redirection of user's activity.
- ▶ The previous definition of digital habits, as well as the features of DSCTs, look easily suitable for an adaptation to a multi-device world.

Goal of the thesis

- ▶ To extend the mentioned strategies in a multi-device context, with a focus on the digital habits.
- ▶ To develop a software tool that implements some of these strategies in a few dedicated multi-device settings.
- ▶ To evaluate the developed tool with an user study.

2 - FeelHabits

FeelHabits strategies

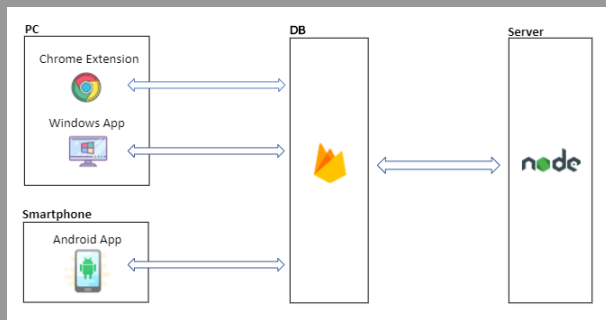
- ▶ In FeelHabits, I tried to adapt the strategies of **time limits** and **launches limits** in a multi-device context composed of the PC and the smartphone.
- ▶ To mitigate multi-device digital habits, the user can define **intentions** that implement these limits in a chosen temporal context (morning/afternoon/night - working days/holidays).
- ▶ When the user reaches a limit, he/she is warned by a blocker or a notification.

FeelHabits Intentions

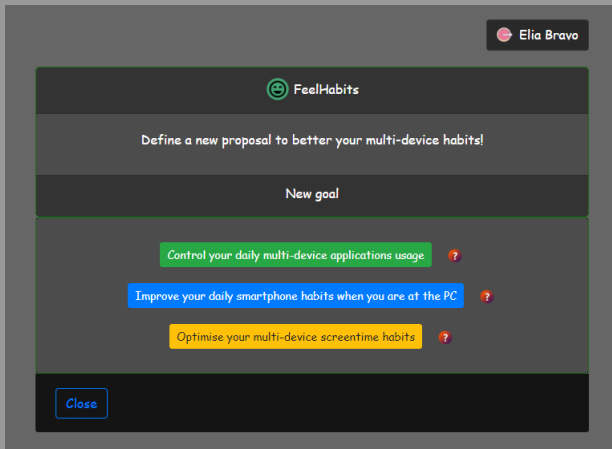
The categories for the intentions are:

- ▶ *Multi-device apps*. To mitigate habits that consist of visiting too often or for too long an application on smartphone and/or the respective website with the PC (time/launches limits → blocker/notification)
- ▶ *Smartphone at PC*. To mitigate habits that involve a excessive usage of a smartphone app while using PC. This is a case of “Multi-device context Habit”. (time/launches limits → blocker/notification)
- ▶ *Screen time*. To form the good habit to make a break after a long multi-device session, and to control the overall daily screen time. (time limit → notification).

FeelHabits Architecture



FeelHabits intention definition: new intention (1/4)



FeelHabits intention definition: When (2/4)

When

Tell me when your bad habit occurs ?

Choose at least one option per line

Working Days (Mon-Fri) Holidays (Sat-Sun) All days

In the morning (6-13) In the afternoon (13-19) By night (19-6) The whole day

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FeelHabits: intention definition: What (3/4)

Control your multi-device applications usage

What

Select the involved application(s) in your habit

Choose one or more options

Smartphone apps + URLs on PC ?

Amazon Shopping Ebay Privalia Wish Zalando Facebook Instagram Pinterest

Telegram Tiktok Twitter WhatsApp Mediaset Play Netflix Prime Video

Twitch YouTube Booking Tripadvisor

Prev Next

FeelHabits: intention definition: How (4/4)

Add a new Timer

Set a timer of

minutes

Once you reach the limit...

- Deny the access (you will be able to ignore the restriction)
- Just send me a notification

ok

Add a new limit for launches

Set a maximum of

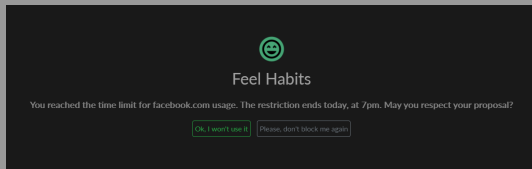
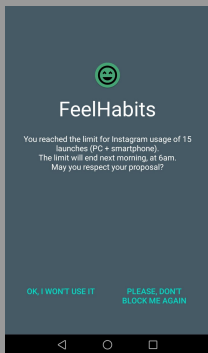
launches

Once you reach the limit...

- Deny the access (you will be able to ignore the restriction)
- Just send me a notification

ok

FeelHabits: blocker examples



3 - Evaluation

FeelHabits test

The user test has been conducted with 7 participants, for 14 full days. I did not provide any suggestions about how to use the application: they were asked to use FeelHabits without any constraints.

After the test period, I evaluated:

- ▶ The choice of intentions.
- ▶ The device usage compared to the set limits, and the reaction to interventions.
- ▶ The users multi-device habits.

Results

- ▶ The average number of intentions kept for the whole test time was 3.
- ▶ The most common intention choices were “multi-device app” (50%) and “smartphone at PC” (43%). Two users defined a non-stop session limit.
- ▶ About the intentions at app level, the associated intervention choices were blockers (16) and notifications (16).
- ▶ The most common category for app choice was social networks (46%), followed by communication (22%), and video (18%).
- ▶ Generally, users deleted intentions to substitute them with new ones.
- ▶ Users behaviours were significantly varied: some users (2) tried to respect restrictions and improved their behaviours, other participants (2) often ignored them.

Discussion

- ▶ Users are not fully aware of their digital usage. Launches limits are typically underestimated, time limits sometimes too long.
- ▶ the “smartphone at PC” intention looks as the most suitable for every user (multi-device context habits).
- ▶ The “multi-device apps” intention choices contained limits associated with a single device, other included aggregate limits, but their usage was more commonly performed with a unique device.
- ▶ The non-stop sessions have been overestimated by the system.
- ▶ In general, the FeelHabits app received positive feedback for the effectiveness in reducing some app-related digital interactions.

Future Work

- ▶ Detecting more precisely the PC usage sessions and controlling the Windows desktop apps.
- ▶ Involving other digital devices (smartwatch, tablet, smart TV).
- ▶ Implementing an automatic system able to detect the multi-device habits and consequently suggest the most adapt interventions for the user.

FeelHabits: multi-device app-context habits

user	applications	context
user 1	Homescapes → <i>web.whatsapp.com</i> primevideo.com → <i>Instagram</i>	afternoon - working days night - working days

Thank you!

Any questions?