

# Software Appropriation: Promoting Tailoring Possibilities and Evaluating their Impact

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## Abstract

Interactive systems can be tailored by end-users, for instance by modifying command layouts, to better match their needs and preferences. While this might be beneficial by increasing productivity for certain tasks, it can also be detrimental if layouts of commands break design logics and are changed too often. This project aims at tackling two challenges. First, we will (1) study how interfaces currently promote tailoring possibilities and how it can be improved. Then, we will (2) study the actual quantitative and qualitative impact of tailoring actions on end-users workflows, with a specific focus on the impact and duration of the tailoring actions and their effects.

## Context

Interactive systems' designs often focus on stereotypical tasks to provide tailored actions such as browsing the web, editing virtual documents, or reading and sending emails. This approach relies on a one-size-fits-all strategy and fails to accommodate various use cases and preferences. For instance, users may need to personalize systems' toolbars (e.g., Mozilla Firefox, MS Word, Affinity Designer) to expose hidden commands or reduce cluttering to adapt the interface to their tasks, or to automate email management to sort and filter them out, which we refer to as tailoring tasks. While some systems facilitate automation with extensions (e.g., Firefox) or modify their source code to change their layout and more (e.g., Emacs), **knowing what can be changed, when it can be beneficial to do so, and engaging in tailoring tasks to customize or extend their functionalities** remain major challenges.

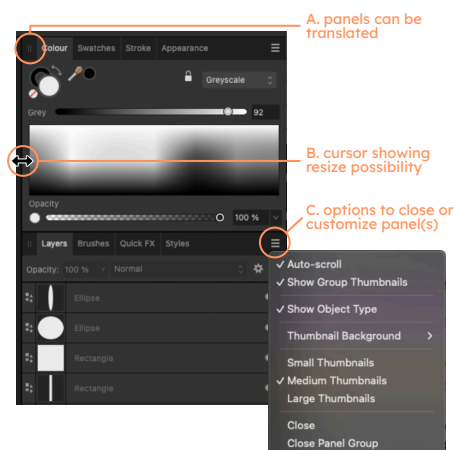


Figure 1: Examples of in-context signifiers for tailoring command panels in Affinity Designer 2. They consist of a static representation of a *handle* (A), dynamically changing the mouse cursor when hovering an area (B), and opening a menu by clicking an icon (C).

A major challenge is the lack of *signifiers* exposing possibilities and opportunities to tailor a system. Some signifiers exist in current interactive systems (see examples in Affinity Designer 2 on [Figure 1](#)). Yet, they may not convey enough information on the tailoring actions they signify, and be too subtle to be noticed. Furthermore, they mostly support *real-time* modifications and do not particularly adapt to tailoring *in anticipation* of future needs, or *in reflection* of tasks already performed; e.g., indicate commands that were not used in the last working session that could be potentially hidden to free space up.

Another challenge is to identify and assess the actual quantitative and qualitative benefits of tailoring software features and behaviors. While changes may be perceived as beneficial by end-users, they may actually create conflicts with the original design of an application and fail to follow structural rules that ensure logical consistency; e.g., users could hide commands that are not required on the short-term but required on the long-term [2].

One potential focus could be on use cases of interface layouts personalizations. Such personalizations can expose commands and reduce cluttering and be beneficial on the short and long term [4], but also detrimental if significant commands disappear or the task change

## Research Questions & Goals

We consider the following questions in this project:

1. **when should information be provided about tailoring possibilities, how to provide in-context information, and what interactive means support end-users in knowing about tailoring possibilities?**
2. **what impact can have tailoring actions on users' workflows with regard to performance and satisfaction, both positively and negatively?**

Regarding the first question, a possible exploration is to study means to convey in-context information of tailoring possibilities [1] and create a design space of visual signifiers conveying information on tailoring tasks, building on our previous work [3]. The candidate could study when signifiers should be provided, and whether they must adapt to tailoring tasks in anticipation of significant events (e.g., preparing email filters for a project), in timing with them (e.g., creating a shortcut for a command when using it), or in reflection of significant events (e.g., creating a code snippet after writing structured text). Examples of signifiers *in timing* and *in reflection* are presented on [Figures 2](#) and [3](#).

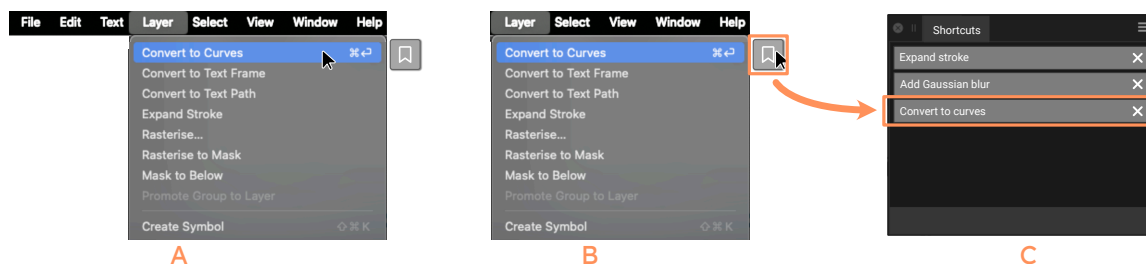


Figure 2: Envisioned signifier leveraging **tailoring actions in timing** with selecting commands. (A) The user hovers a command in a spring menu which makes a bookmark icon appear. (B) Clicking on the icon would (C) add the command to a (floating) panel in the overall interface supporting faster access.

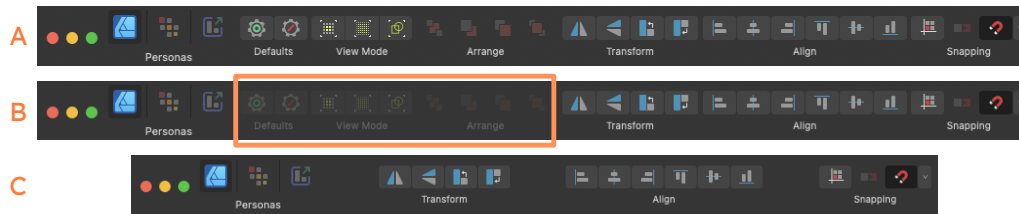


Figure 3: Envisioned signifier leveraging **tailoring actions in reflection** of past actions. From (A) a default toolbar, (B) commands that are rarely used slowly disappear, (C) nudging end-users to remove them manually.

Regarding the second question, a possible exploration is to study how the duration and effects of tailoring actions impact end-users engagement in them. End users can target, for instance, *disposable* personalizations that would be used only for a short time (e.g., creating a macro for a single working session) or engage in longer tailoring tasks to adapt their entire workspace for multiple working sessions. The candidate could investigate the benefits of adapting the interaction means available to engage in tailoring tasks based on their average duration. The focus could be on 2 primary factors: the *repetition* of the tasks to complete and the *duration* of the tailoring task (which is correlated to its complexity).

## Candidate

The candidate must have (or be about to obtain) a Master's degree or equivalent in Computer Science or Human-Computer Interaction, and demonstrate a strong interest in research. They should have experience and a strong interest in software development, interaction design and strong programming skills. Creativity, independence, team spirit and communication skills are valuable assets. A good level of technical and scientific English is also required.

To apply, send your resume and a cover letter by email to Bruno Fruchard (bruno.fruchard@inria.fr), Mathieu Nancel (mathieu.nancel@inria.fr), and Sylvain Malacria (sylvain.malacria@inria.fr) with "[Application] Software Appropriation: Promoting Tailoring Possibilities and Evaluating their Impact" as object of the e-mail. In addition to what is generally expected, the cover letter should highlight what you find particularly interesting in this topic, why current solutions are limited, as well as describe your overall vision for this project. Ideally, it should also elaborate on why you are interested in working in academic research.

All applications are welcome, regardless of age, gender, social or ethnic origin, sexual orientation, or disability. For the integration of people with disabilities, we are working on possible adaptations of the positions to be filled - within the limits of the applicable rules for the safety of people: do not hesitate to contact us to tell us about your situation.

## References

- [1] M. Ekstrand, W. Li, T. Grossman, J. Matejka, and G. Fitzmaurice. Searching for software learning resources using application context. In *Proceedings of the 24th Annual ACM Symposium on User Interface Software and Technology*, UIST '11, pages 195–204, Santa Barbara, California, USA. Association for Computing Machinery, 2011. DOI: [10.1145/2047196.2047220](https://doi.org/10.1145/2047196.2047220).
- [2] L. Findlater and J. McGrenere. Beyond performance Feature awareness in personalized interfaces. en. *Computer Studies*:17, 2010.
- [3] E. Mackamul, G. Casiez, and S. **Malacria**. Exploring visual signifier characteristics to improve the perception of affordances of in-place touch inputs. *Proc. ACM Hum.-Comput. Interact.*, 7(MHCI), Sept. 2023. DOI: [10.1145/3604257](https://doi.org/10.1145/3604257).

- [4] J. McGrenere, R. M. Baecker, and K. S. Booth. An evaluation of a multiple interface design solution for bloated software. In *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems*, CHI '02, pages 164–170, Minneapolis, Minnesota, USA. Association for Computing Machinery, 2002. DOI: [10.1145/503376.503406](https://doi.org/10.1145/503376.503406).