Loki
technology & knowledge for interaction

# Impact of Switching Spatial Configurations on Learning Software Features

**Team(s)** Loki (Centre Inria de l'Université de Lille & CRIStAL)
**Level** Master
**Duration** 6 months
**Advisor(s)** Bruno Fruchard, Sylvain Malacria, Mathieu Nancel **[Contact advisor(s)]**

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## Abstract

Graphical user interfaces (GUIs) can be tailored by end-users to better match their needs and preferences, and better adapt to their tasks. 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. We propose to study the impact of frequent changes on the learning of interface features through controlled user studies on memorization.

## Context and Objectives

Interactive systems' designs often focus on stereotypical tasks that rely on a one-size-fits-all strategy and fail to accommodate various use cases and preferences. Software like Blender or Adobe Premiere Pro, for instance, propose by default several workspaces that expose and hide certain commands, and change the spatial structure of interactive features (see Figure 1). While this can lead to exposing less commands and facilitating visual searches as well as potentially reducing physical efforts to select commands, it can also conflict with spatial landmarks used by spatial memory to locate fixed commands [2, 3].

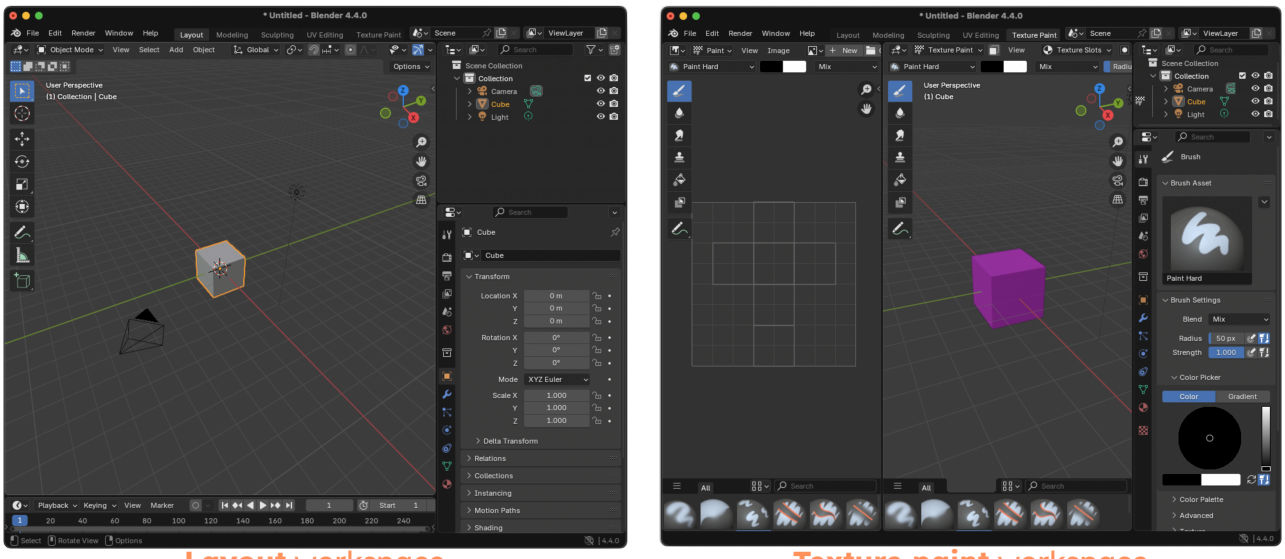


Figure 1: Examples of in-context signifiers for tailoring command panels in Affinity Designer 2. They consist of a static representation of a *handle* (A), dynamically changing the mouse cursor when hovering an area (B), and opening a menu by clicking an icon (C).

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To understand the impact of switching workspaces on feature learning, we will compare two major conditions: displaying only subsets of adequate commands for specific tasks, and displaying a complete and spatially consistent set of commands [2, 1]. Through a controlled memorization study performed over a few days or weeks, we will evaluate how efficient are participants with a given software to perform a set of controlled tasks (e.g., drawing shapes in Inkscape), and how much they retain of the interface features in both conditions.

## Tasks

In summary, the candidate will:

1. design a controlled user study to investigate the impact of interface layouts on feature learning
2. program an experimental setup, either form open-source software like Inkscape or Gimp or from scratch, to capture participants' performances
3. statistically analyze empirical results to draw conclusions on the impact of workspaces on users workflows

## Candidate

The candidate must be in a Master's program studying 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] Impact of Switching Spatial Configurations on Learning Software Features" 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] B. **Fruchard**, E. Lecolinet, and O. Chapuis. How Memorizing Positions or Directions Affects Gesture Learning? In *ISS '18*, ISS '18, pages 107–114, Tokyo, Japan. ACM, Nov. 2018. DOI: 10.1145/3279778.3279787.

[2] J. Scarr, A. Cockburn, C. Gutwin, and S. **Malacria**. Testing the robustness and performance of spatially consistent interfaces. In *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems*, CHI '13, pages 3139–3148, Paris, France. Association for Computing Machinery, 2013. DOI: 10.1145/2470654.2466430.

[3] M. S. Uddin, C. Gutwin, and A. Cockburn. The effects of artificial landmarks on learning and performance in spatial-memory interfaces. In *Proceedings of the 2017 CHI Conference on Human Factors in Computing Systems*, CHI '17, pages 3843–3855, Denver, Colorado, USA. Association for Computing Machinery, 2017. DOI: 10.1145/3025453.3025497.