Université de Bouira
Faculté des sciences
Département de Informatique

# Module IHM

5

# IHM

Ergonomic criteria
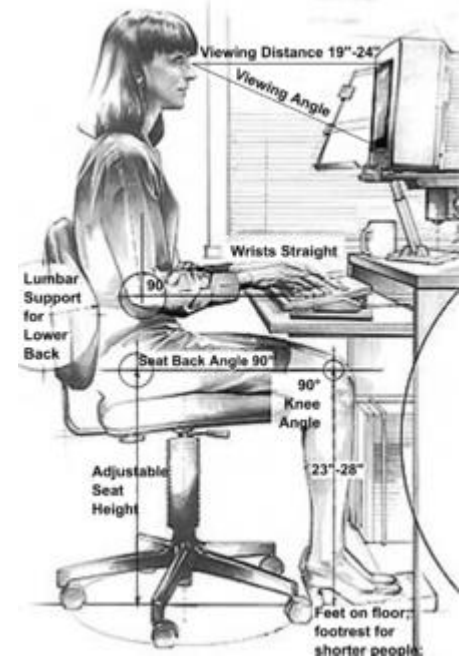
# Bastien & Scapin Ergonomic criteria

## Rappelle

# Bastien & Scapin Ergonomic criteria

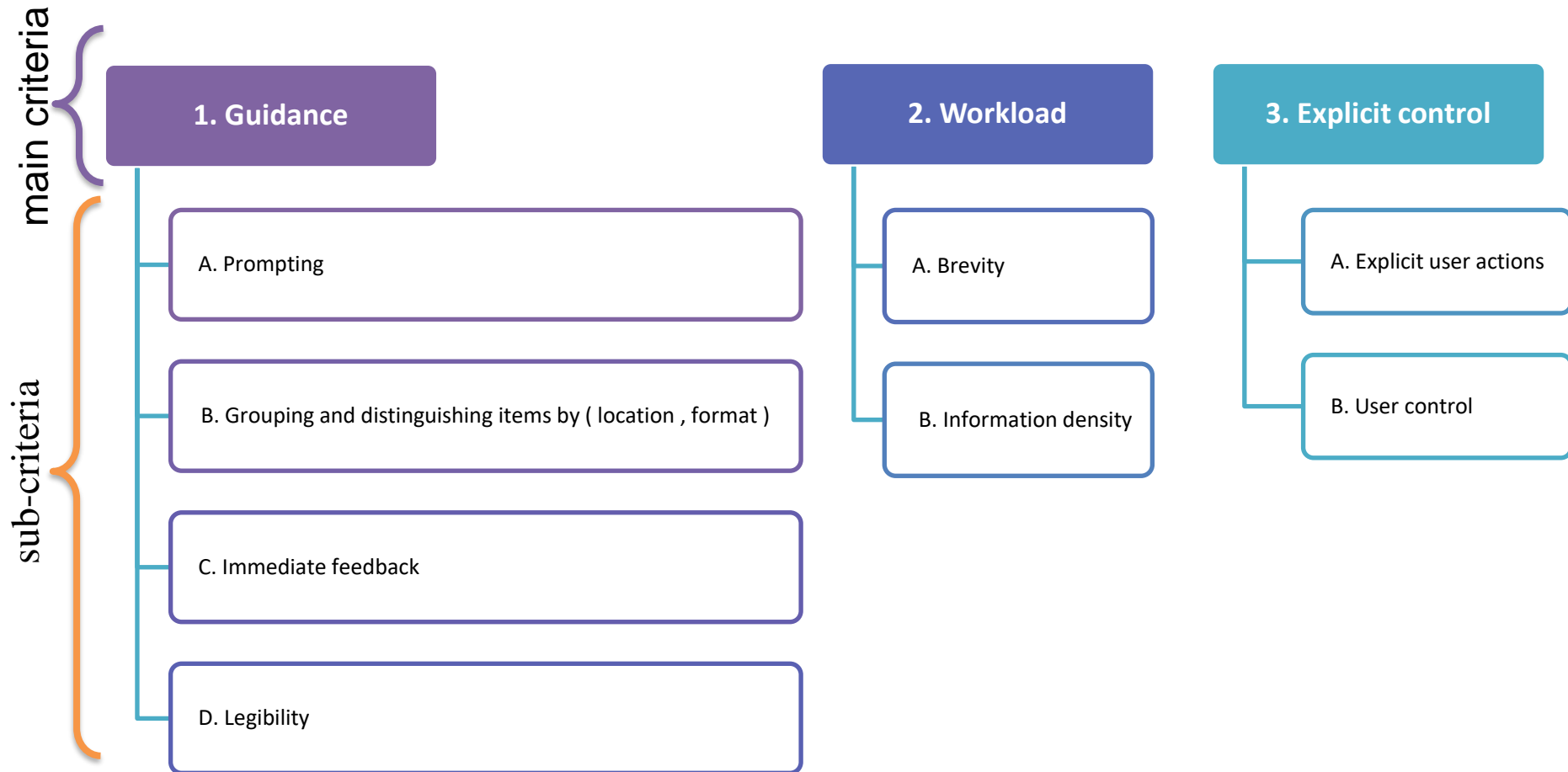| | | | |
|---|---|---|---|
| 1. Guidance | 2. Workload | 3. Explicit control | 4. Adaptability |
| 5. Error management | 6. Consistency | 7. Significance of codes | 8. Compatibility |

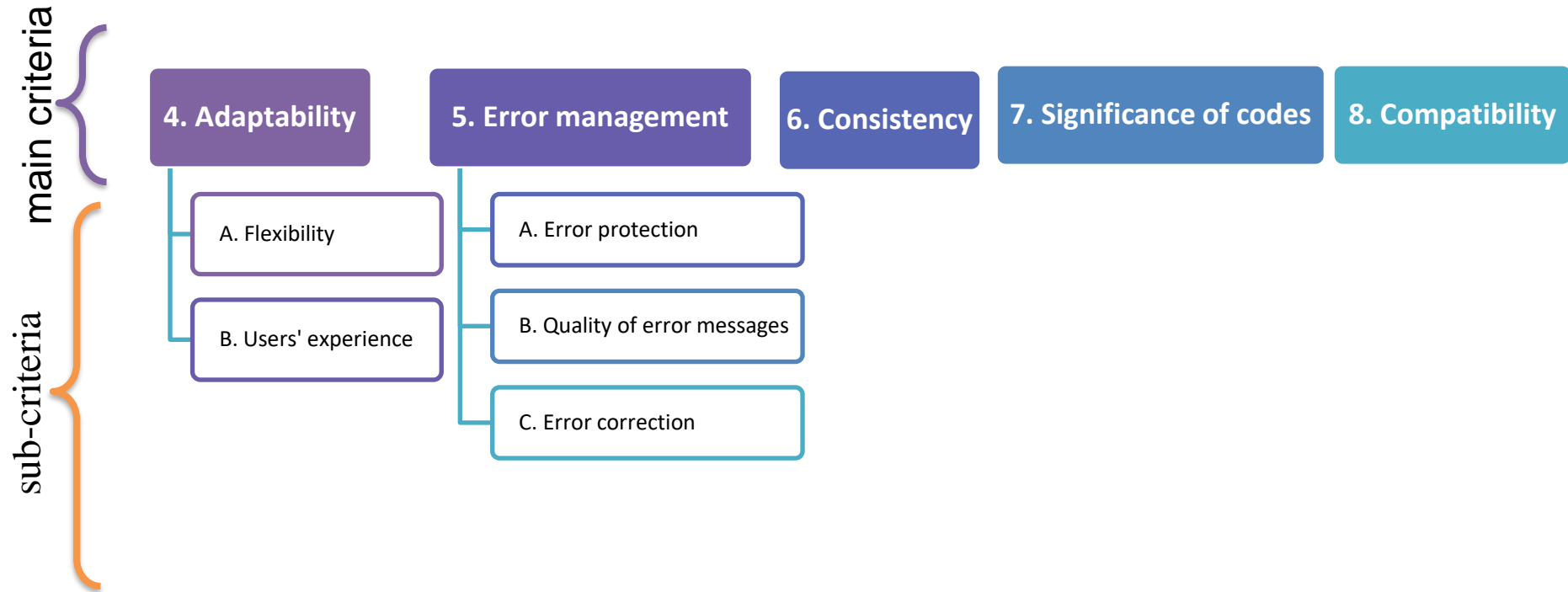# Bastien & Scapin Ergonomic criteria

**The Bastien & Scapin ergonomic criteria** are divided into main criteria and sub-criteria

**main criteria**

**sub-criteria**

**1. Guidance**

A. Prompting

B. Grouping and distinguishing items by ( location , format )

C. Immediate feedback

D. Legibility

**2. Workload**

A. Brevity

B. Information density

**3. Explicit control**

A. Explicit user actions

B. User control

**The Bastien & Scapin ergonomic criteria** are divided into main criteria and sub-criteria

# Bastien & Scapin Ergonomic criteria

**En**

| 1. Guidance | 2. Workload | 3. Explicit control | 4. Adaptability | 5. Error management |
|---|---|---|---|---|

| 6. Consistency | 7. Significance of codes | 8. Compatibility |
|---|---|---|

**Fr**

| 1. Guidage | 2. Charge de travail | 3. Contrôle explicite | 4. Adaptabilité |
|---|---|---|---|

| 5. Gestion des erreurs | 6. Cohérence | 7. Signifiance des codes | 8. Compatibilité |
|---|---|---|---|

**Ar**

| 5. إدارة الأخطاء | 4. قابلية التكيف | 3. السيطرة الصريحة | 2. عبء العمل | 1. التوجيه |
|---|---|---|---|---|

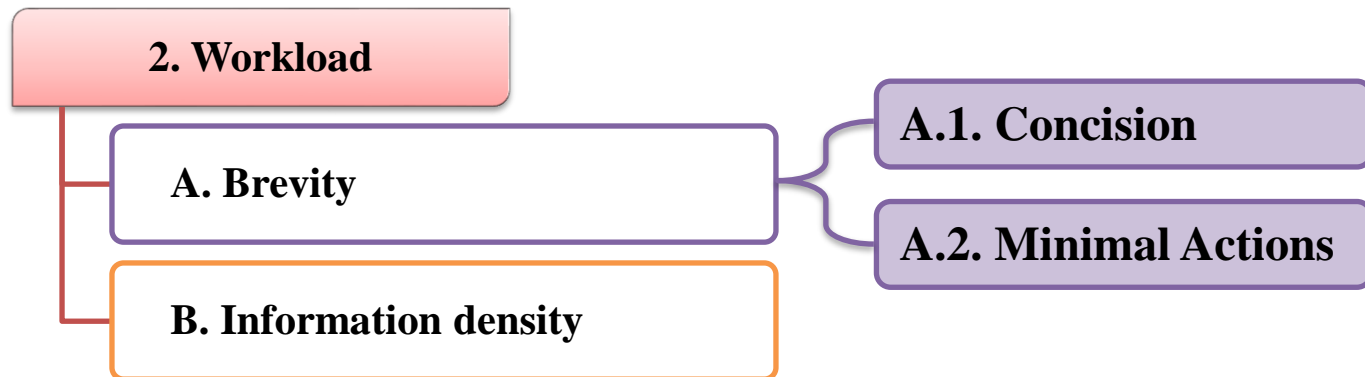| 8. التوافق | 7. دلالة الرموز | 6. التناغم (الاتساق) |
|---|---|---|

## Bastien & Scapin Ergonomic criteria

2 WORKLOAD

## 2. Workload

**Workload,** as a key element of Bastien & Scapin's ergonomic criteria, plays a pivotal role in designing user interfaces that are efficient, intuitive, and minimize user effort. It focuses on **reducing** the **cognitive** and **physical** demands placed on users when interacting with the system.

The criterion Workload is subdivided into two criteria: Brevity (which includes Concision and Minimal Actions), and Information Density.

```
2. Workload
├── A. Brevity
│       ├── A.1. Concision
│       └── A.2. Minimal Actions
└── B. Information density
```

## 2. Workload

Optimize Navigation

Leverage Visual Cues

Employ Progressive Disclosure

Task Simplification

auto-completion

Simplify Data Entry

Utilize Shortcuts

Reduce the Number of Steps

Consider Physical Strain

## A. Brevity criterion

| The Brevity | En | La Brièveté | Fr | الإيجاز | Ar |

The criterion of brevity in user interface design emphasizes the importance of presenting information in a concise and straightforward manner. It advocates for minimizing the amount of text, visual elements, and interactions required to complete tasks without sacrificing clarity or comprehensiveness.

The brevity criterion brings together all the means aimed at reducing the perceptual and memory load of the user in their interactions with the input or output components of the user interface (fields of a form, menus, widgets, ...).

- It is therefore a question of limiting the user's **reading** and **input** work as much as possible (we talk about **Concision**).

- This criterion also includes the notion of **minimal action** which aims to minimize the **number** of actions necessary to achieve a goal, to **accomplish** a task.

## A. Brevity criterion

| The Brevity | En | La Brièveté | Fr | الاختصار | Ar |

### A.1. Concision

| La Concision | الايجاز |

In the realm of user interface design, **Concision** refers to the principle of presenting **information** in a **clear**, **direct**, and **succinct** manner. It advocates for **minimizing redundancy**, eliminating unnecessary elements, and streamlining interactions to enhance user comprehension and reduce cognitive load. Concision is closely related to brevity, but it places a stronger emphasis on the clarity and effectiveness of the communication. It encompasses the use of succinct language, well-structured layouts, and appropriate visual elements to effectively communicate with users without overwhelming them with unnecessary details.

The art of conveying information using the fewest possible words while maintaining clarity and precision.

## A. Brevity criterion

**A.1. Concision** | La Concision | الايجاز

### Recommendations:

1. **Use Clear and Simple Language:** Employ clear, simple, and direct language, avoiding jargon or technical terms that may confuse users.

2. **Prioritize Essential Information:** Identify the core information that users need to understand and prioritize its presentation, eliminating unnecessary details.

3. **Structure Content Effectively:** Organize content in a logical and hierarchical manner, using headings, subheadings, and bullet points to enhance readability and scannability.

4. **Utilize Visual Hierarchy**: Employ visual elements, such as font size, color, and spacing, to create a visual hierarchy that guides users' attention to the most important information.

## A. Brevity criterion

### A.1. Concision
La Concision | الايجاز

**Recommendations:**

5. **Avoid Redundancy:** Eliminate redundant information that duplicates or repeats existing content. Ensure that each element serves a distinct purpose.

6. **Leverage White Space:** Utilize white space strategically to separate elements and create visual hierarchy, enhancing readability and scannability.

7. **Provide Contextual Cues:** Offer contextual cues, such as tooltips or pop-ups, to provide additional information when necessary without cluttering the interface.

8. **Employ Icons and Symbols:** Utilize icons, symbols, and other visual cues to convey information concisely and visually, especially in situations where text may be overwhelming or inappropriate.

## A. Brevity criterion

**A.1. Concision**   La Concision   الايجاز

**Recommendations:**

9. **Employ Progressive Disclosure:** Reveal information gradually, only providing details when relevant to the user's current task or context.

10. **Utilize Defaults and Auto-Completion:** Provide default values and auto-completion features to minimize repetitive data entry and reduce the need for manual input. Make it easy for the user to change default settings.

11. **Offer Customizable Options:** Allow users to customize the interface to their preferences, providing them with control over the amount of information displayed.

12. **Employ Shortcuts and Keyboard Navigation:** Provide shortcuts and keyboard navigation options to enable quick and efficient task completion for power users.

## A. Brevity criterion

A.1. Concision | La Concision | الايجاز

## Recommendations:

**13. Consider User Expectations:** Design the interface with user expectations in mind. Use language, symbols, and icons that are familiar and consistent with users' mental models.

**14. Seek Feedback and Iteration:** Continuously gather feedback from users and iterate on the design to refine the conciseness and effectiveness of the interface.

Checkboxes are useful for indicating whether a specific condition applies to the user. If a condition includes additional form fields, use progressive disclosure to conceal them. Only reveal them if users select the checkbox. This allows users to focus on the required fields for faster form completion.

A. Brevity criterion

# Bastien & Scapin Ergonomic criteria

## A. Brevity criterion

To provide users with better focus, use an accordion interaction on high-density information. This allows users to scan the overview information first. It'll then disclose the details on selection when they're relevant.

# Bastien & Scapin Ergonomic criteria

Pre-select the user's country based on their **geolocation** data.

## Billing Address

Country *

Australia ▾

First Name *

Last Name *

A. Brevity criterion

**Don't use defaults for input fields that require user attention**
Do not use defaults for anything that requires user thought (e.g. signing up for newsletters or accepting terms of use).



☑ I agree to receive the newsletter

Don't

☐ I agree to receive the newslett

Do

A. Brevity criterion

A. Brevity criterion
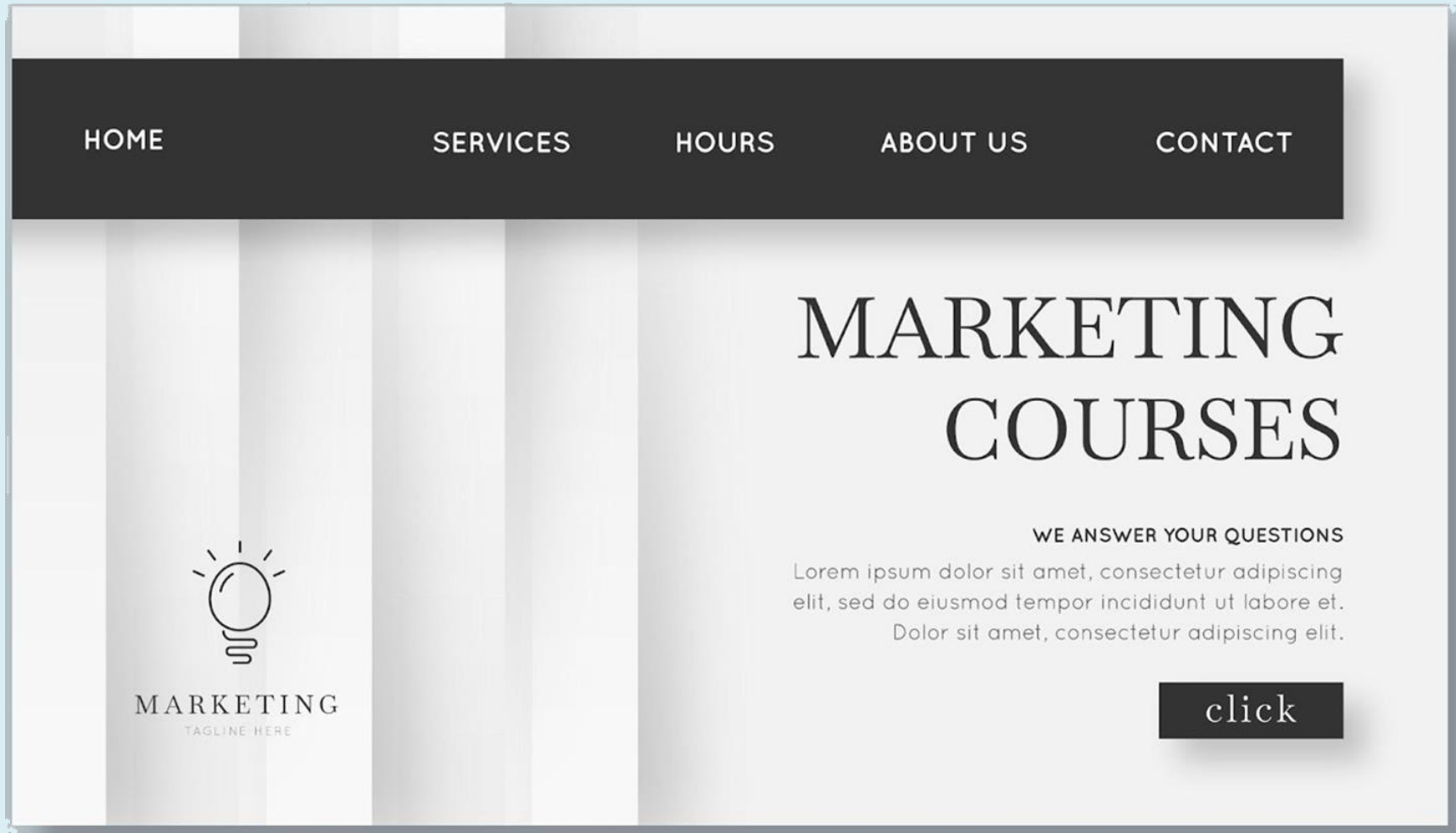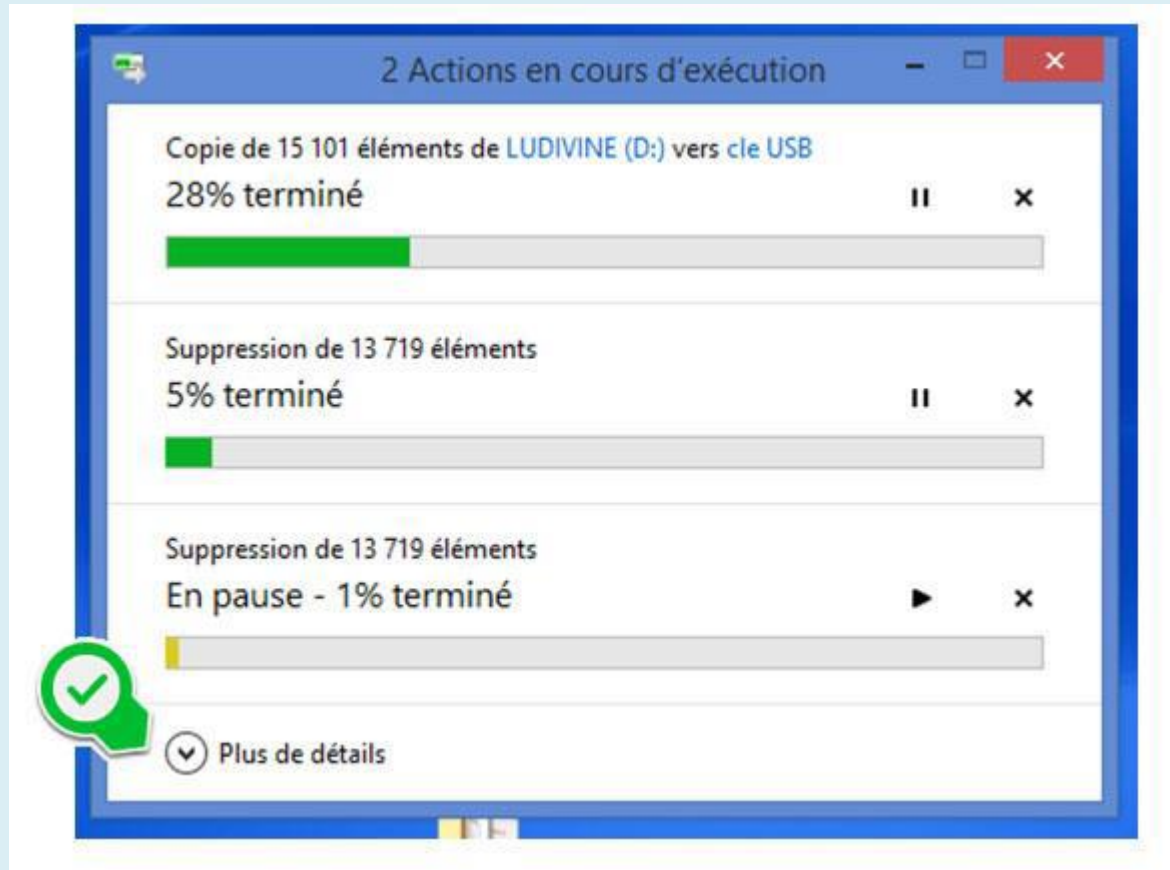
## A. Brevity criterion

| The Brevity | En |
|---|---|

| La Brièveté | Fr |
|---|---|

| الاختصار | Ar |
|---|---|

## A.2. Minimal actions

Actions minimales

الحد الأدنى من الإجراءات

In the realm of UI design, the **minimal actions** criterion advocates for reducing the number of steps and interactions required to complete tasks. It emphasizes streamlining interactions, eliminating unnecessary steps, and providing users with direct and efficient paths to achieve their goals.

## A. Brevity criterion

### A.2. Minimal actions | Actions minimales | الحد الأدنى من الإجراءات

**Recommendations:**

1. **Task Analysis**: Analyze user tasks to identify opportunities for streamlining and reducing steps.to simplify the process, eliminating unnecessary steps and reducing complexity.

2. **Progressive Input:** Allow users to enter information in stages, providing feedback and validation as they proceed.

3. **Contextual Assistance:** Offer contextual assistance, such as tooltips or pop-ups, to provide guidance and support without disrupting the workflow.

4. **Keyboard Shortcuts:** Provide keyboard shortcuts for common actions and power users to enable quick and efficient task completion.

## A. Brevity criterion

| A.2. Minimal actions | Actions minimales | الحد الأدنى من الإجراءات |
|---|---|---|

### Recommendations:

5. **Hidden Options:** Consider hiding advanced or infrequently used options to reduce clutter and maintain a clean interface.

6. **Undo and Redo Functionality**: Implement undo and redo functionality to allow users to easily recover from mistakes without starting over.

7. **Consistent User Flow:** Maintain a consistent user flow throughout the interface to avoid surprises and minimize the need for users to learn multiple workflows.

8. **Enable Predictive Input:** Implement predictive input features, such as auto-completion or suggestions, to anticipate user needs and reduce the need for typing.

## A. Brevity criterion

| A.2. Minimal actions | Actions minimales | الحد الأدنى من الإجراءات |
|---|---|---|

### Recommendations:

9. **Leverage Automation:** Automate repetitive tasks or processes to minimize user involvement and reduce the number of steps required.

10. **Design for Multiple Platforms:** Consider the limitations and affordances of different platforms, such as mobile devices or touch screens, and adapt the interface accordingly to minimize actions.

Progressive Disclosure

Default Values and Auto-Completion

User Testing and Feedback

## A. Brevity criterion

A.2. Minimal actions | Actions minimales | الحد الأدنى من الإجراءات

**Recommendations:**

### Exemples:

- **Minimise** the number of steps required to make a selection in a menu.

- Do not require **data** entry by the user when the data can be **derived** by the **computer**.

- Avoid users' entries of commands that include **punctuation**.

- For **data entry**, display currently defined default values in their appropriate data fields.

- For long, **multipage displays**, it should be possible to request a particular page **directly**, without having to go through all intermediary pages.

## B. Information Density criterion

Information Density **En** | Densité de l'information **Fr** | كثافة المعلومات **Ar**

The criterion of "Information Density" is another important aspect of usability evaluation and design. It focuses on the amount of information presented to users within an interactive system and how effectively it is displayed and organized. The goal is to find the right balance between providing sufficient information and avoiding overwhelming users with excessive or cluttered content.

In the realm of UI design, information density refers to the amount of information presented to users within a given screen space or interface element.
- User performance is negatively influenced when the information load is too high or (more rarely) too low.
- It is therefore necessary to remove all elements not directly linked to the current task and which could unnecessarily distract users.
- Advertising banners (or pop-up windows) are examples of an (unnecessary?) increase in the information density of the interface.

# Bastien & Scapin Ergonomic criteria

## B. Information Density criterion

| Information Density En | Densité de l'information Fr | كثافة المعلومات Ar |
|---|---|---|

**Recommendations:** To effectively manage information density, consider these strategies:

1. **Prioritization:** Prioritize the most important information and ensure it is prominently displayed and easily accessible. Consider using visual hierarchy, such as font size, color, and spacing, to guide users' attention to the most critical information.

2. **Progressive Disclosure:** Reveal information gradually, only presenting details when relevant to the user's current task or context.

3. **Interactive Elements:** Utilize interactive elements, such as filters, sorting options, and collapsible sections, to allow users to control the amount of information displayed.

4. **Data Visualization:** Use charts, graphs, and other visual elements to present complex data in a concise and easily understandable format.

## B. Information Density criterion

### Recommendations:

5. **Responsive Design:** Adapt the information density based on the device and screen size, ensuring optimal presentation on desktops, laptops, tablets, and smartphones.

6. **Chunking and Organization**: Chunk large amounts of information into smaller, digestible pieces to enhance readability and scannability. Use headings, subheadings, bullet points, and lists to organize information logically and create visual cues for easy navigation. "Break down lengthy text into smaller, more digestible chunks to improve readability and avoid overwhelming users."

7. **Visual Elements**: Utilize visual elements, such as icons, charts, and graphs, to convey information in a visually appealing and concise manner. Visuals can effectively summarize complex data or concepts, reducing the need for extensive text.

8. **White Space:** Strategically utilize white space to separate elements, create visual balance, and prevent the interface from appearing cluttered. White space provides breathing room for the eyes and enhances the readability of text.

## B. Information Density criterion

**Recommendations:**

### Exemples:

- Only display **relevant information** to perform the task (simple **dialog boxes**, **graphical** representations, etc.)
- Avoid screens that are **too busy** (break it down if necessary)
- Avoid too **many links** in text displayed on a web page
- Avoid texts that are **too verbose** (**simple dialogue**, **short sentences**)
- Prioritize recognition (**symbols**, **icons**)

## B. Information Density criterion

### Recommendations:

| GUI Application | Example of Information Density Management |
| --- | --- |
| **Online shopping website** | Utilize tabs, accordions, and expandable sections to organize product information. |
| **News website** | Employ chunking, clear headings, and white space to improve readability of articles. |
| **Social media platform** | Implement filters, sorting options, and chronological timelines to control information flow. |
| **Maps and navigation app** | Use color-coding, symbols, and icons to convey information concisely on maps. |
| **E-commerce app** | Employ progressive disclosure, expandable sections, and visual hierarchy to manage product details. |
| **Messaging app** | Implement chat threads, timestamps, message grouping, and search functionalities to organize and locate messages. |
| **Word processing software** | Utilize menus, toolbars, and contextual menus to organize tools without overwhelming users. |
| **Graphic design software** | Employ tool palettes, customizable workspaces, and keyboard shortcuts for efficient tool access. |
| **Project management software** | Use dashboards, filters, and customizable views to focus on relevant project information. |

A message that we don't really want to read...

- Avoid texts that are too verbose (simple dialogue, short sentences).

B. Information Density criterion

**JavaScript**

Thank you for your interest in browsing out catalog! It's Easy and it's Efficient! Adobe Acrobat Reader 4.0 uses a 'Pointing Finger' with a 'W' for a mouse pointer whenever you encounter an area where a 'Selection' can be made. When the catalog index page appears, you will notice that the 'Pointing Finger' will appear when you pass over an index item (Product Type) that is selectable. If you click on an item, the pages related to that product will be downloaded to you. Each page has been modularized so that typical download times with a V.90 modem will not exceed 60 seconds with the average download time less than 20 seconds. Depending on your Browser, you may not see a time line, just be patient and the pages will appear. In some cases another index page will appear requiring further selection. The same process should be followed. Using the pager in Acrobat Reader is easy and efficient and in a short time you will be an expert at it. To return to the previous index, simply click your Browser 'Back' button. Two other configurations of mouse pointers are also used by Acrobat Reader. An 'Open Hand' for moving the page around and a 'Magnifier' for zooming in and out while viewing the page. You may select either one from the tool bar at the upper part of the screen. Please carefully jot down the Model Numbers of interest so that they can be entered accurately in the on-line ordering system.

OK

Delete elements unrelated to the content of the current task.
- Avoid overloading HMIs with information and features

**B. Information Density criterion**

# Bastien & Scapin Ergonomic criteria

What are the necessary, useful functions (abundance is harmful in certain circumstances).

B. Information Density criterion

Bastien & Scapin Ergonomic criteria

**3 EXPLICIT CONTROL**

## 3. Explicit control

**explicit control** refers to the principle of providing users with clear and direct mechanisms for interacting with the interface and controlling their actions. It emphasizes the use of intuitive and unambiguous controls that minimize confusion and allow users to take ownership of their interactions.

The explicit control criterion is subdivided into two criteria: Explicit user actions, and User control.

3. Explicit control

A. Explicit user actions

B. User control

## A. Explicit user actions

| Explicit Actions En | Actions explicites Fr | الإجراءات الصريحة Ar |
|---|---|---|

In the realm of UI design, explicit user actions refer to deliberate and unambiguous interactions that users initiate to control the interface and perform tasks. These actions are clearly defined and visible, allowing users to understand the consequences of their interactions and navigate the interface with confidence.

The criterion Explicit User Action refers to the **relationship** between the **computer processing** and the **actions of the users**. This relationship must be explicit, i.e., the computer must process **only** those actions requested by the users and **only** when requested to do so.

# Bastien & Scapin Ergonomic criteria

## A. Explicit user actions

### Recommendations:

❖ **Avoid Automatic Actions:** **Minimize** the use of **automatic actions** that trigger without explicit user input, as they can lead to surprises and unintended consequences.

❖ **Clear Visual Cues:** Employ **clear visual** cues, such as **buttons**, **menus**, and **dropdown** lists, to indicate actions and options available to users.

❖ **Consistent Interactions:** Maintain **consistent** interaction patterns across the interface, so users can learn and apply their knowledge to different functionalities.

❖ **Confirmation Prompts:** Provide **confirmation prompts** for critical actions, such as deleting data or making irreversible changes, to prevent accidental mistakes.

❖ **Undo/Redo Functionality:** Implement **undo/redo** functionality to allow users to reverse actions and recover from errors, reducing frustration and enabling experimentation.

## A. Explicit user actions

**Recommendations:**

- Do not trigger operations without the explicit consent of the user.

  - Always require a user to take an explicit ENTER action to initiate processing of entered data; do not initiate processing as a side effect (e.g., updating a file) of some other action (e.g., printing a file).

- If menu selection is accomplished by pointing, provide for dual activation, in which the first action (positions a cursor) designates the selected option, followed by a separate second action that makes an explicit control entry.

- Users' command entries should be completed with an ENTER action following editing facilities.

- Trigger the operation immediately after the user action or, alternatively, clearly indicate that the operation will be deferred (or that it cannot be performed).

**A. Explicit user actions**

**A. Explicit user actions**



**Confirm deletion**

Are you sure you would like to delete this profile from the database? This action cannot be undone.

Cancel    Delete



Notepad

Do you want to save changes to C:\New document.txt?

Save    Don't save    Cancel



Remplacer ou ignorer les fichiers

Déplacement de 27 éléments de Tags vers ok

La destination comprend 18 fichiers dont les noms sont identiques.

✓ Remplacer les fichiers dans la destination

↩ Ignorer ces fichiers

↻ Me laisser décider pour chaque fichier

Plus de détails

A. Explicit user actions



**m PIXELS** | CHRONIQUES DES (R)ÉVOLUTIONS NUMÉRIQUES | VIE EN LIGNE | JEUX V

Windows 10 téléchargé automatiquement et sans avertissement sur certains ordinateurs

Le Monde | 11.09.2015 à 09h37

Microsoft télécharge automatiquement Windows 10 chez les utilisateurs de certaines anciennes versions du système d'exploitation, révèle le site spécialisé The Inquirer.

Les utilisateurs qui ont activé le programme de téléchargement automatique de mise à jour voient donc les fichiers d'installation du dernier-né de Microsoft

## B. User control

| User control En | Contrôle utilisateur Fr | تحكم المستخدم Ar |

User control is a fundamental principle in usability and user experience design. It refers to the degree of control and autonomy given to users over their interactions with an interactive system or interface. User control allows individuals to navigate, manipulate, and customize their experience according to their preferences and needs.

The user control criterion concerns the fact that the user must always have control over the system and control its operations and their progress (**interrupt**, **resume**).

- It aims to make the user **autonomous** in their interaction with the system by giving them control of the process.
- The user must have **permanent** control over the software.
- If possible, its actions should be **facilitated** and **appropriate** control options should be provided to it based on the current state of the system (taking into account the current situation).

## B. User control

**Recommendations:**

- Allow users to personalize the information displayed and the order in which it appears.
- Offer the user explicit validation of important or difficult to reverse commands
- Allow, at any time, to exit the current function or even the software
- Allow users to pace their data entry, rather than having the pace being controlled by computer processing or by external events.
- The cursor should not be automatically moved without users' control (except for stable and well known procedures, such as in form-filling).
- Users should have the control over the screen pages.
- Allow users to interrupt or cancel a current transaction or process.
- Provide a CANCEL option which will have the effect of erasing any changes just made by the user and restoring the current display to its previous version.
- Allow rollbacks (Undo)

- Allow users to interrupt or cancel a current transaction or process.

B. User control

# Bastien & Scapin Ergonomic criteria

**B. User control**

**Bookmarks and Favorites:** Users can save frequently accessed information for future reference.
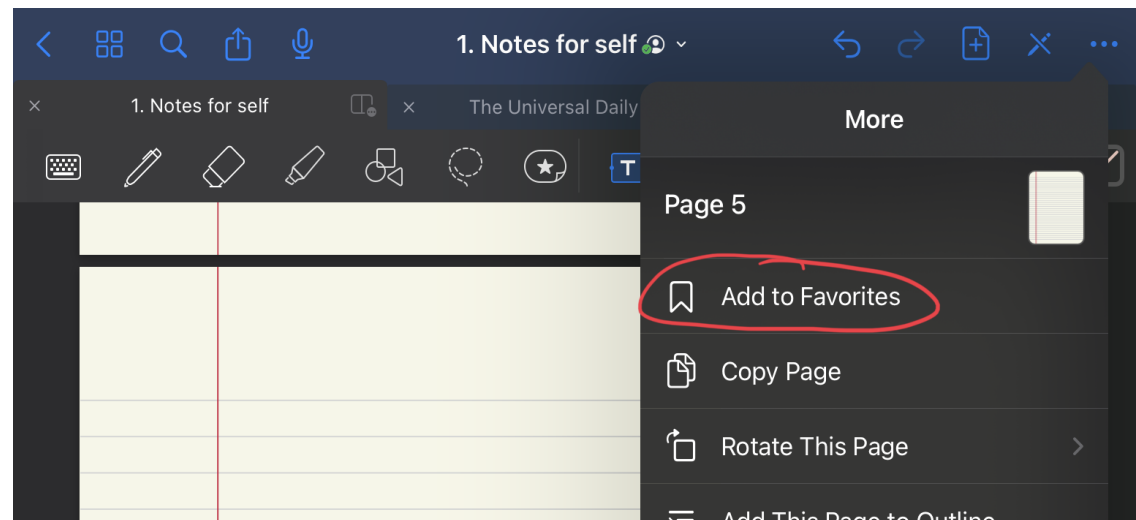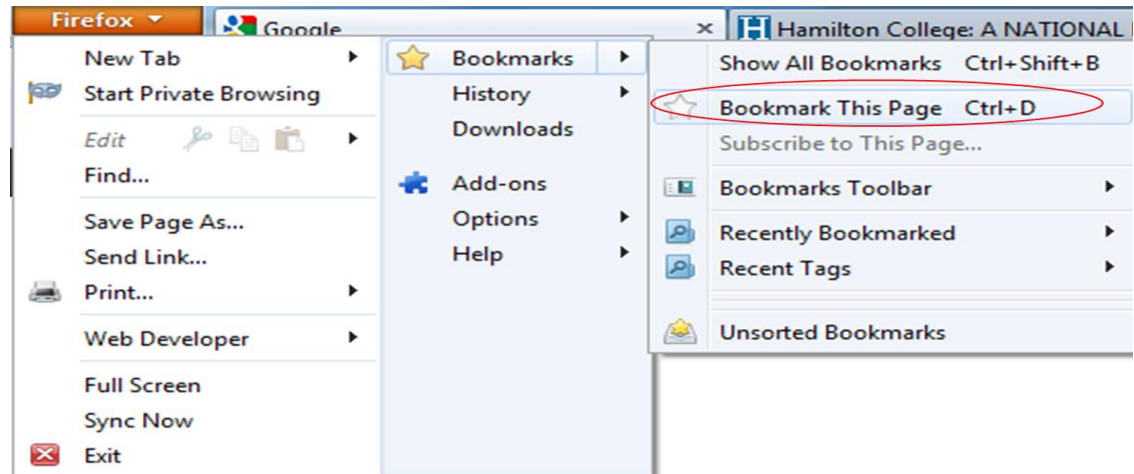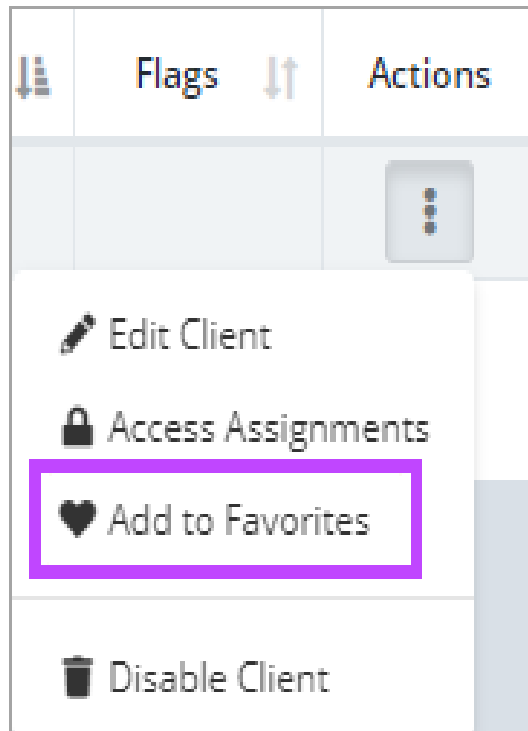
**Privacy Settings:** Users can control the visibility and access to their personal information.

**B. User control**
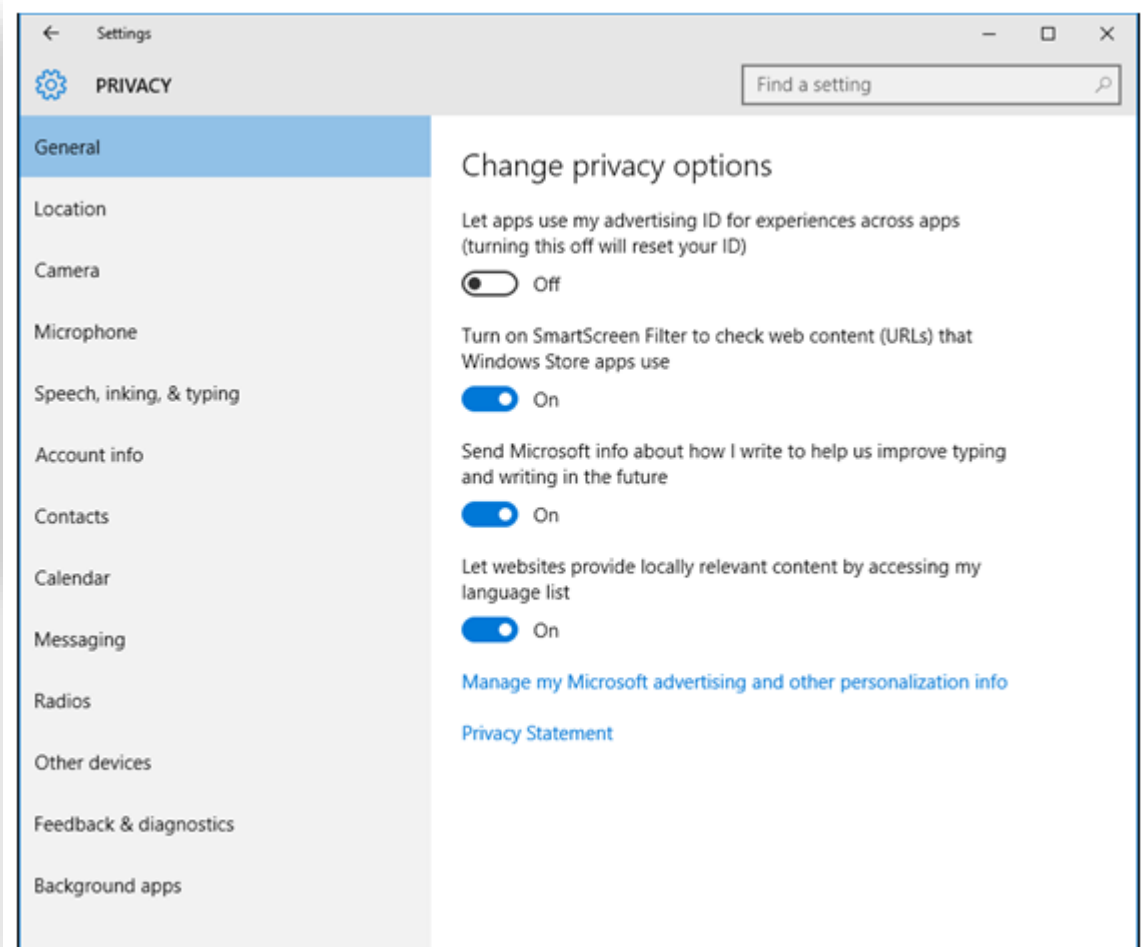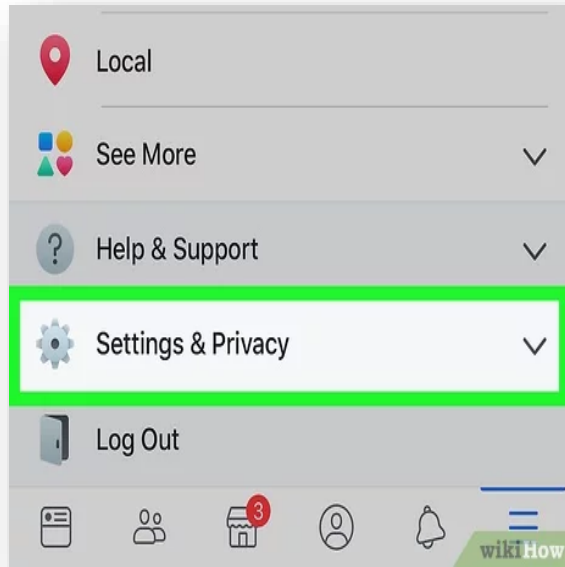
**Themes and Skins**: Allowing users to choose from different themes or skins to personalize the interface's visual appearance.
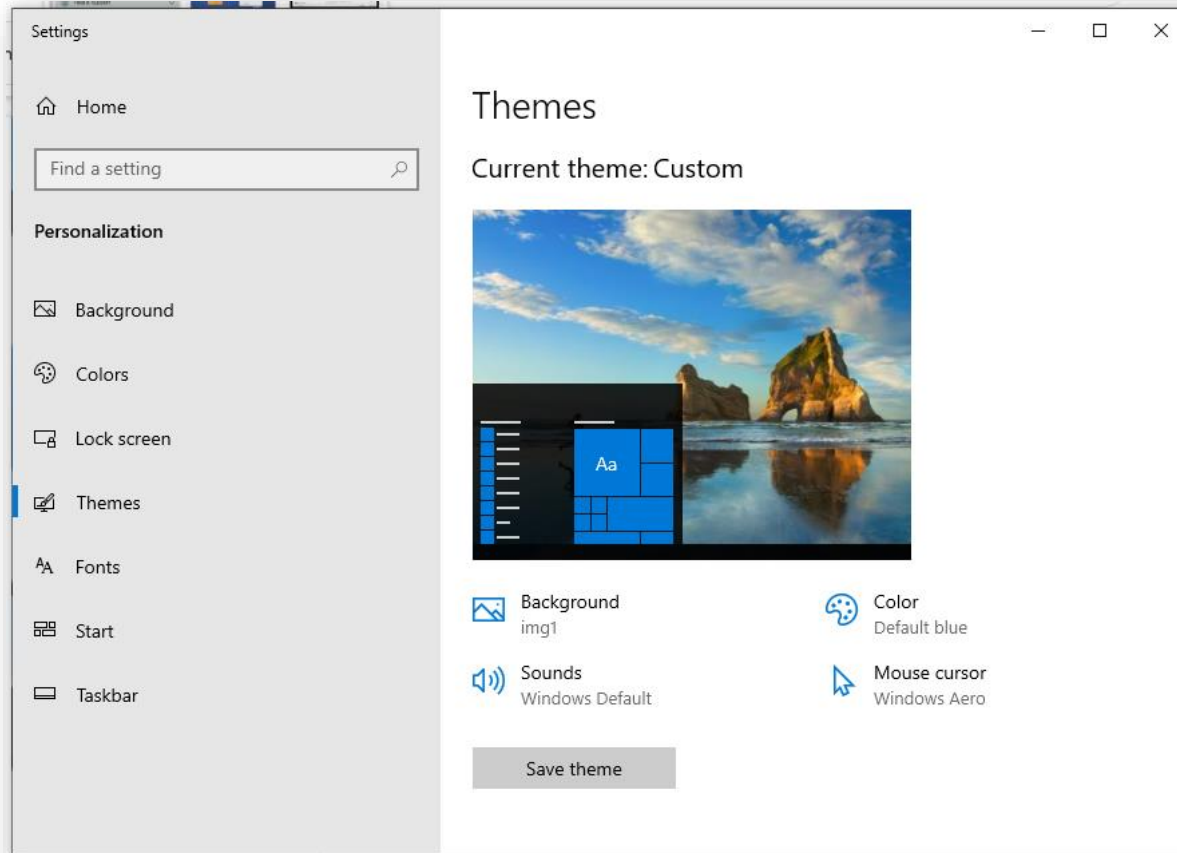
B. User control

**Dashboards:** Enabling users to customize the layout of dashboards and the information displayed to focus on relevant data.

B. User control

# Bastien & Scapin Ergonomic criteria

**Filtering and Sorting:** Providing options to filter and sort data based on user preferences, facilitating efficient information retrieval.

**B. User control**
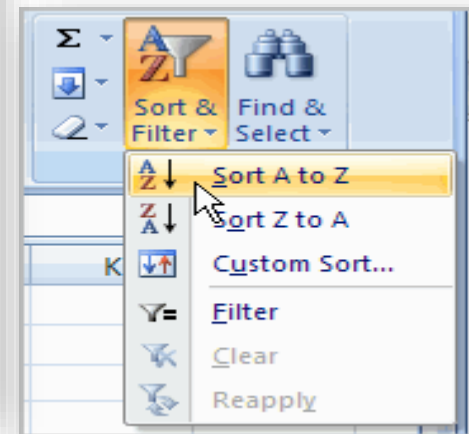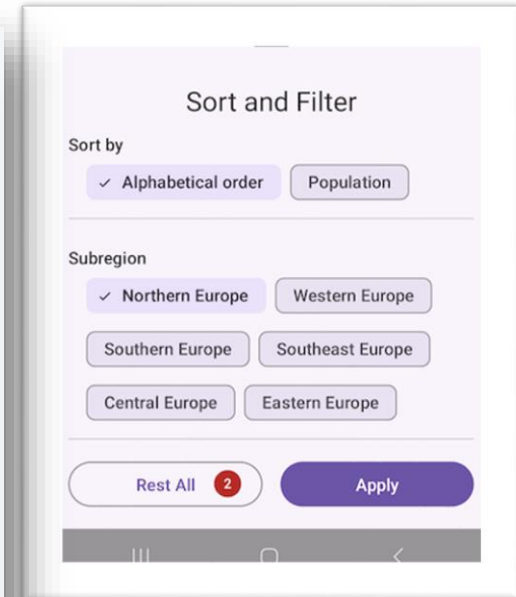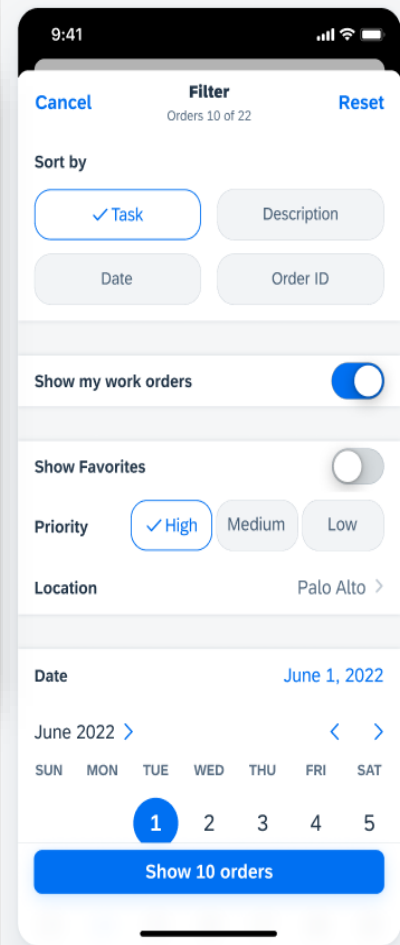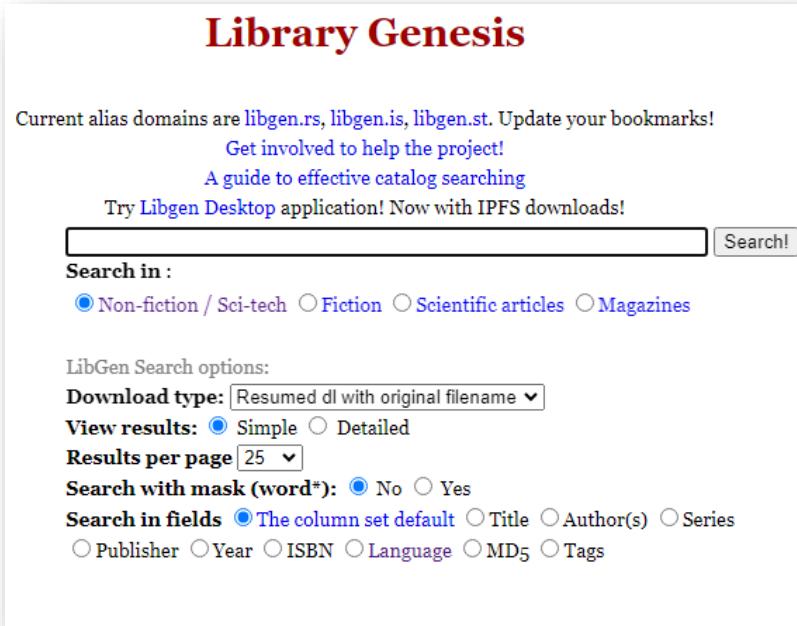
**B. User control**

**Editable Text Fields:** Users can edit and modify text directly, giving them control over the content.

**B. User control**

**Accessibility Settings:** Offering various accessibility features, such as font size adjustments, high contrast mode, and screen reader support, to cater to users with diverse needs.

**B. User control**
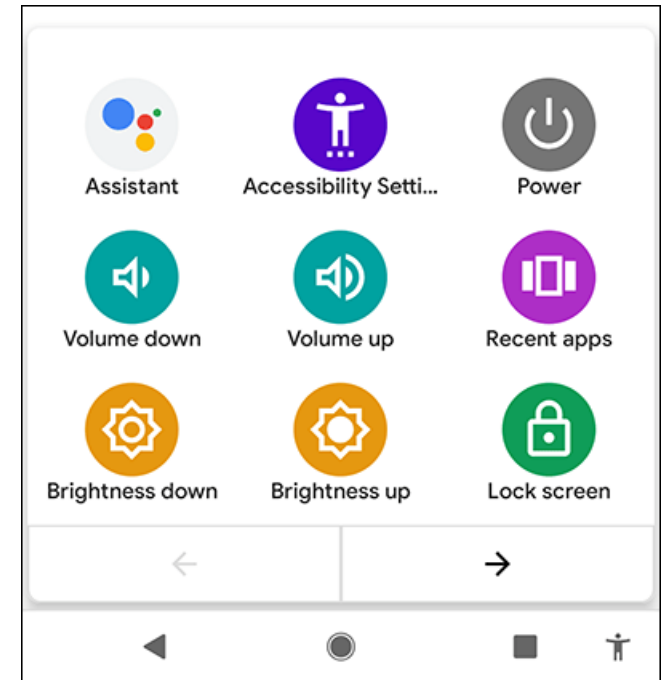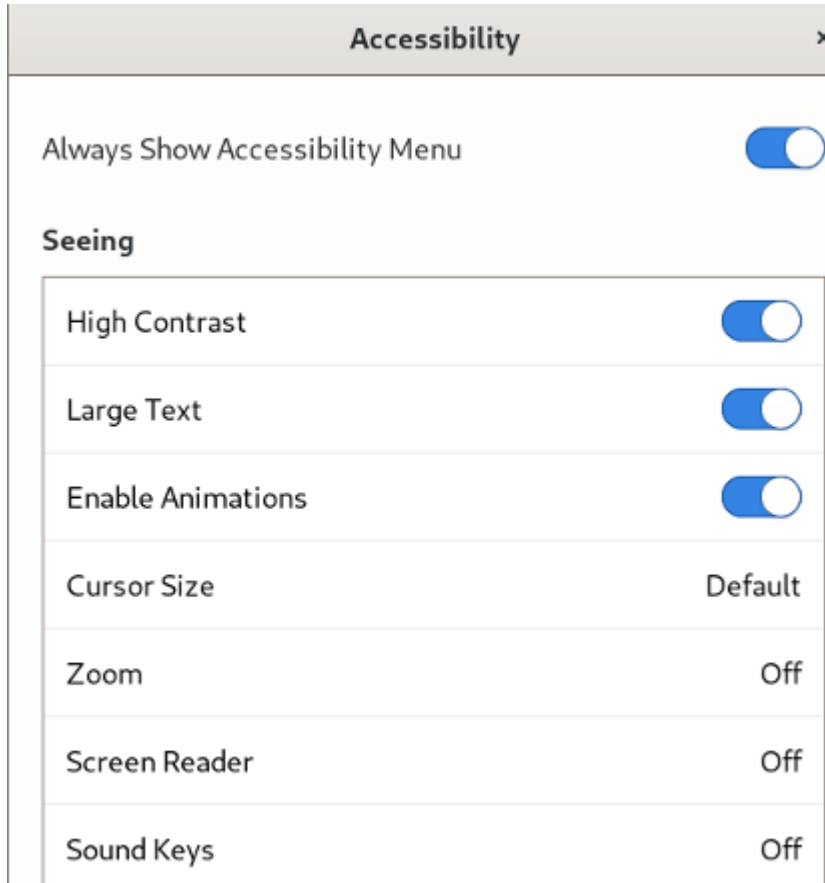
**Keyboard Customization:** Enable users to customize keyboard shortcuts for frequently used actions.

**B. User control**
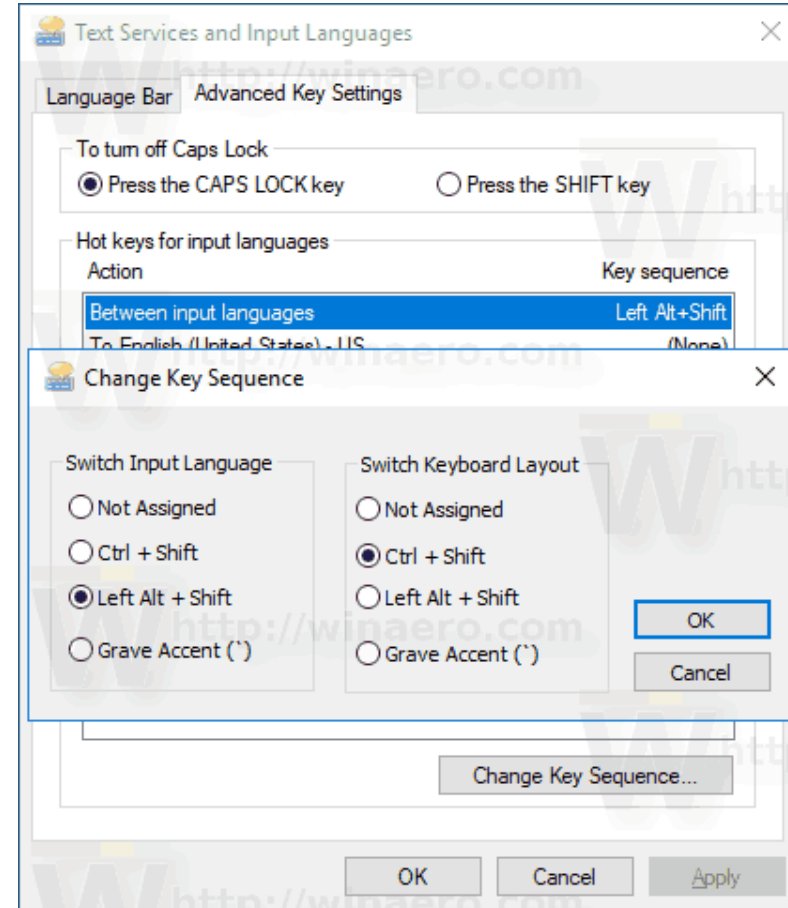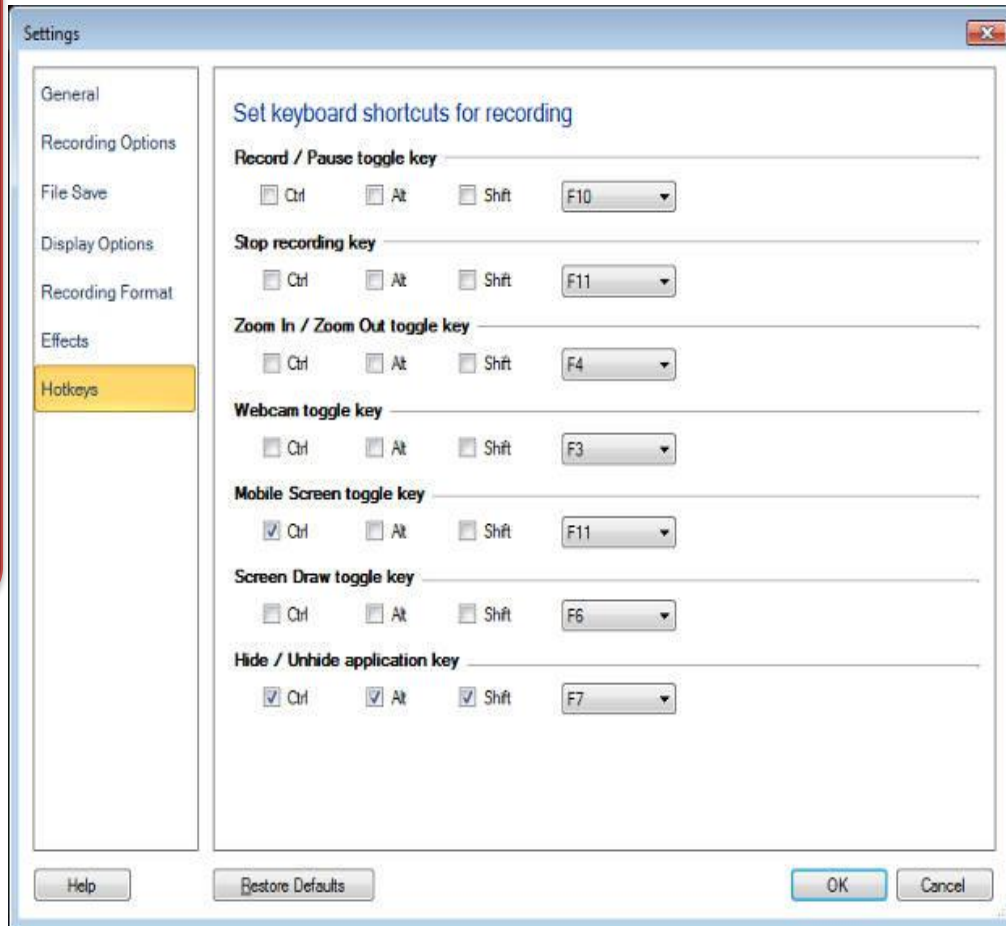
**User Profiles:** Allow users to create and manage profiles with individual settings and configurations to personalize their experiences across multiple sessions.

**3. Explicit control**

**B. User control**

**Undo/Redo Functionality:** Allow users to undo and redo actions to recover from mistakes or experiment without fear of permanent changes.



Redo

Undo