



TYOLOGIES AND PATTERNS OF INFORMATION ARCHITECTURE In the User Interfaces of Meta's Social Networks (Instagram)

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ABSTRACT

Information Architecture (IA) organises digital content ranging from web interfaces to ATM screens and car dashboards. Beyond structure, it encompasses the labelling and organisation of information within each interface. Presented through mind maps, IA is essential in both academic and professional environments. In complex products such as social networks, multiple IA patterns are employed simultaneously. This research introduces IA to Applied Communication Sciences, highlighting its significance for enhancing user experience in social networks. The study identifies standard patterns and new types of mental maps for digital creation.

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1. Introduction

Information Architecture (IA) refers to the mental map used to organise the contents of a digital product or artefact. By digital product or artefact, we mean the set of user interfaces that make up a website, an application, the display system of an ATM, or even the interfaces of a car's dashboard. In a broad sense, IA is not only concerned with the structure of content but also with the labelling processes of different information units and the organisation of information within each user interface of a digital product.

IA is organised based on navigation and vice versa, with mind maps being the most common representation method in academic and professional contexts. Various types and forms of mind maps are consistently used as patterns in the creation processes of digital products to represent their IA. In digital products with numerous interaction processes, such as Meta's social networks, different IA patterns or typologies can be found simultaneously.

This research aims to familiarise the scientific community in Applied Communication Sciences with the concept of IA, recognising it as an essential resource for achieving a good user experience (UX) through various possible navigation paths in the primary social networks. The study approaches these networks as a set of user interfaces, or in other words, as digital products.

The methodology seeks to identify standard IA patterns among the main functions of the Instagram social network, as well as to explore the potential existence of less common and novel mind maps that could be recommended as IA patterns in digital creation processes.

2. Object of Study and Objectives

The purpose of the research in this article is to study the types of IA used in social networks. To achieve this, the research aims to meet the following objectives:

1. Identify the most commonly used IA typologies in major digital social networks.
2. Define the essential user navigation paths to determine the User Interfaces (UIs) that a user interacts with to complete a task.
3. Identify the IA pattern (mental map) on which the navigation described by these user journeys is based, and represent it in its corresponding mental map, identifying resources, techniques, and standard and specific elements that facilitate user interaction with Instagram.
4. Detect if there are different IAs nested within the same interface that constitute the various routes.

3. Research Design: Methodology

The methodology used to achieve the objectives is qualitative, based on observing and analysing user journeys. It aims to:

1. Define two basic user tasks or objectives when interacting with the set of interfaces that make up the social network.
2. Formulate and analyse these tasks as user navigation paths, paying special attention to interactions with the different content units of the IA. The tasks studied are "Publish content" and "View content."
3. Identify the UIs interacted with in the two user journeys under study, map the transitions from one interface to another, and thus draw and define the mental map of Instagram's IA.
4. Determine whether the IA maps obtained correspond to standard typology patterns already described. To this end, the IA typologies of Tidwell et al. (2019) and recommended typologies, techniques, and resources for IA design from Google's Material Design and Apple's Developer Guidelines have been documented for this research.
5. Identify any IA typologies that are not classified and designate them as new.

The multi-phase methodology is based on content analysis, which applies to many contexts. For this research, we have relied on its tradition of studying IA typologies and their significant elements. Outside the field of Applied Communication, there is existing scientific research on information typology

patterns in digital products, often related to specific information systems, such as Gourov & Gourova's (2015) study on IA design patterns for cloud service systems. Although research on IA patterns in digital products has existed since the early days of the internet, such as Zimmerman & Walls' (2000) study on website typologies, research is scarce with a social science perspective, less technological, and applied to social networks primarily used on mobile devices. However, Karatsolis & Karatsoli-Chanikian (2014) explore interaction linked to IA by reviewing both IA design and user interaction with the content units.

4. Towards Defining Information Architecture

IA not only organises content in the form of a mind map but also defines navigation and displays the content elements of a digital product by indicating the relationships between them. In the process of creating digital artefacts or products, developing the IA is one of the first and most fundamental steps, as subsequent design decisions are based on the mind map that defines it. According to Baxter et al. (2015), good IA helps users find information or elements and perform their tasks with ease. This recommendation underscores the importance of applying User-Centred Design principles when designing the IA of digital products, such as social networks.

Although this article focuses on IA in digital creation, it is also important to mention that IA is not a concept strictly limited to digital products; it also applies to physical products, such as the signage in a shopping centre, as Baxter et al. (2015) states.

5. Definitions of Information Architecture

In scientific literature, there are various definitions of IA that range from complex to simple, and from broad to concise.

Rosenfeld et al. (2015) describes IA as an emerging discipline that brings design and architectural principles into the digital realm and already has a substantial community of practitioners. He argues that IA is a broad and complex concept that cannot be summarised in a single sentence, as it encompasses several aspects outlined in the following three points:

1. The structural design of shared information environments.
2. The synthesis (or concretisation) of organisational, tagging, search, and navigation systems within digital, physical, and cross-channel ecosystems.
3. The art and science of shaping information products and experiences to ensure usability, findability (ease of locating specific content), and comprehension (Rosenfeld et al., 2015).

According to Rosenfeld et al. (2015), the inability to define IA in a single sentence highlights the complexity involved in designing effective digital products and services.

Tidwell et al. (2019), in his work *Designing Interfaces*, expands upon the "IA in three points" presented by Rosenfeld et al. (2015) by breaking it down into six points. Despite Rosenfeld's et al. (2015) assertion that a concrete definition of IA is elusive, Tidwell et al. provides the following definition: IA is the art of organising and labelling an information space for optimal understanding and use. He further specifies that IA relies on understanding users to design the following then their six elements:

1. Structures or categories to organise content and functionality.
2. The different ways users can navigate through the experience.
3. Intuitive workflows or multi-step processes to achieve task completion.
4. Labels and language to communicate content effectively.
5. Search, navigation, and filtering tools to help users find what they need.
6. A system of standard display types, templates, or layouts to ensure consistent and usable presentation of information" (Tidwell et al., 2019, Chapter 2 section).

Elizabeth Allen (2018) offers a simplified definition of IA, summarising it as the way in which the contents of a site, app, or product are organised. This encompasses not only the overall structure of the product but also how content is organised on each page and screen.

Among the three definitions presented, Allen's (2018) is the simplest, while Tidwell et al. (2019) is the most detailed. The information provided by all of them indicates that developing IA is a process

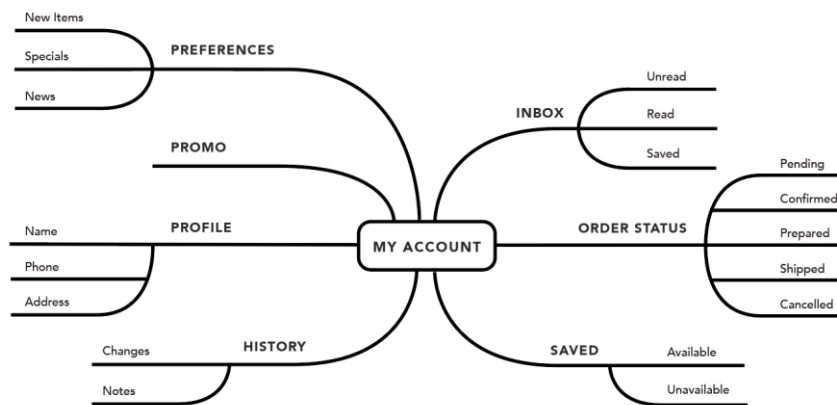
involving multiple tasks such as tagging content, organising searches, and reviewing users' browsing experiences. Although it may seem straightforward, as Rosenfeld et al. (2015) points out, it is actually quite labour-intensive and complex.

6. Mind Maps as a Tool for Visual Representation of IA

IA is represented using a mind map. According to Gibbons (2019), "A mind map is a tree that represents a topic and its subtopics." Beel and Langer (2011, p. 81) state that "All mind maps have a central node (the root) that represents the main topic of the map. This root node branches outward into child nodes to describe sub-themes." Eppler (2006, p. 203) adds that displaying such sub-topics of a domain or knowledge area, creatively and seamlessly, is the main function of a mind map.

Mind maps are used for tasks requiring a hierarchical structure of information (Beel & Langer, 2011, p. 85). This makes them particularly suitable for representing the IA of a social network or any other digital product. They are especially effective for providing a concise overview of the hierarchy (Eppler, 2006).

Figure 5.1. Example of a Mind Map



Source: Gibbons, 2019. Url: <https://www.nngroup.com/articles/cognitive-mind-concept/>

The closest definition of a mind map for representing IA is, "A mind map is a multicoloured radial diagram with a central image that hierarchically represents semantic or other connections between parts" (Eppler, 2006). In mind maps, related concepts are drawn radially around the central idea and connected by lines (Lin & Faste, 2012).

In UX, mind maps are valuable for categorising ideas and performing tasks such as:

- Listing the components of a particular website to determine a simplified IA of the page.
- Planning the main themes within a site.
- Mapping the information covered (Gibbons, 2019).

This research focuses on the use of mind maps in UX, specifically for deconstructing, planning, and organising the IA of a digital product.

7. IA Typologies Based on Navigation (According to the Mind Map of Navigation)

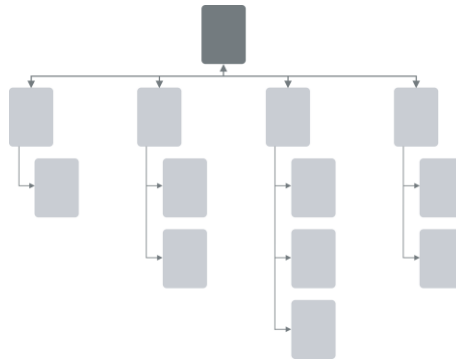
The concept of IA is intrinsically linked to navigation. The architecture of a digital artefact (such as an application or website) is organised based on its navigation, and vice versa. Mind maps are the most effective way to represent this relationship.

When examining the types of mind maps used to visualise the architecture or navigation of a digital artefact, it becomes apparent that certain types are more common, depending on the type of digital product being designed.

7.1. Tree or Multi-Level Structures

One of the most common ways to represent the architecture of a website or any other digital artefact is through a tree or multi-level structure. This hierarchical navigation involves making one choice per screen until reaching the destination. Once the destination is reached, to navigate to a different destination, users must return and make new choices (Apple, Inc., n.d.-a) (see Figure 7.1). In this structure, main pages are fully connected, while sub-pages are only connected to each other and typically to the main pages via global navigation (Tidwell et al., 2019). For example, the Mail and Settings applications in the Mac iOS operating system use this form of navigation (Apple, Inc., n. d.-a).

Figure 7.1. IA Mind Map in Tree Navigation Structure



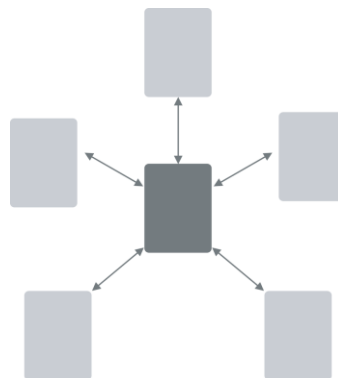
Source: Tidwell et. al., 2019.

7.2. Hub & Spoke Model

Another way to organise navigation, or the architecture according to navigation, is the Hub & Spoke model, also known as "Radial Architecture" or "Star Architecture". This model is widely used in mobile applications. In this architecture, all the main sections of the website or application are listed on the home screen, referred to as the hub. The users select different screens to reach their desired destination, complete their tasks, and then return to the hub to navigate to another part of the product if needed (Tidwell et al., 2019). Figure 7.2 illustrates the mental map of an IA using the Hub & Spoke model. A clear example of this navigation type is the iPhone home screen (see Figure 7.3) (Tidwell et al., 2019).

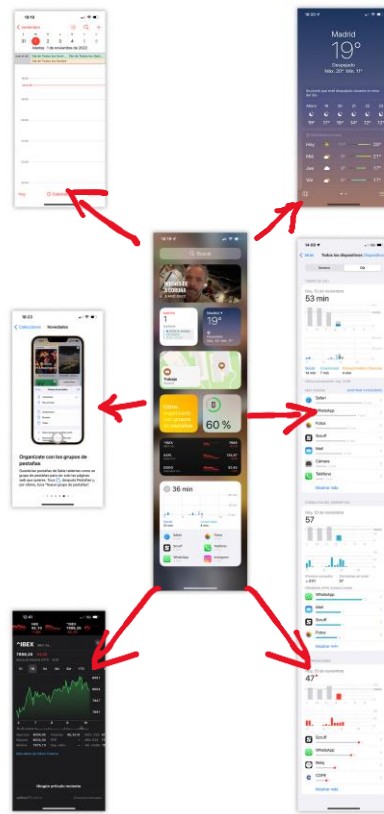
Figure 7.2 shows that in a star structure, transitioning from one sub-page to another requires returning to the home page or hub each time. Figure 7.3 demonstrates this with the home screen of an iPhone, where accessing different applications involves going through the iPhone's home screen, exemplifying the Hub & Spoke model.

Figure 7.2. IA Mind Map in Hub & Spoke Navigation Model



Source: Tidwell et. al., 2019.

Figure 7.3. iPhone Home Screen and Screens Accessible from It



Source: Author(s) elaboration, 2023

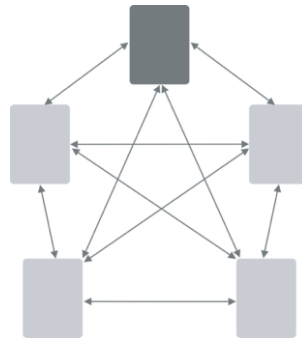
7.3. Other Typologies

According to Tidwell et al. (2019), there are several other ways to organise the navigation of a digital artefact, each represented by different types of IA mind maps:

- **Fully Connected:** This IA model allows navigation from any screen to any other screen on the map without needing to pass through an intermediary screen. Figure 7.4 illustrates that in this navigation structure, every page is directly accessible from every other page, with no central hub or concentrator required.
- **Step-by-Step:** This IA model features interconnected screens that allow linear navigation from page to page in both directions (see Figure 7.5). In this structure, users move through each screen sequentially until they reach their target screen.
- **Pyramid:** In this model, navigation is organised with a home screen as the hub, which is connected to its sub-pages. These sub-pages are then interconnected with each other at their level. Figure 7.6 demonstrates how the Pyramid navigation structure connects the home page or hub to sub-pages, which are interconnected among themselves.

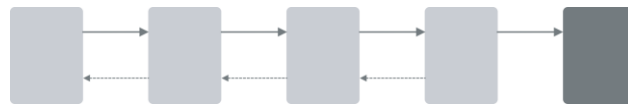
In addition to these common navigation structures, Tidwell et al. (2019) also mention several other types in his work *Designing Interfaces* such as clear entry points, menu pages, modal panels, deep links, escape hatch, fat menus, sitemap footers, sign-in.

Figure 7.4. IA Mind Map in a Fully Connected Navigation Structure



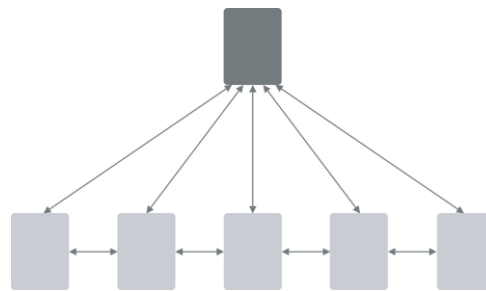
Source: Tidwell et. al., 2019

Fig. 7.5 IA Mind Map in a Step-by-Step Navigation Structure



Source: Tidwell et. al., 2019

Figure. 7.6. IA Mind Map in Pyramid Navigation Structure



Source: Tidwell et. al., 2019

Although some authors, such as Allen (2018), suggest that IA also pertains to how content is organised on each screen, it should be clarified that "all of these models of mind-mapped architecture indicate the navigation model and are independent of the screen layout" (Tidwell et. al., 2019, Chapter 3 section).

8. Recommended Resources and Techniques for IA Design and Navigation in Apps that Optimise the UX.

We study navigation and IA in social networks, viewing them as digital apps primarily designed for mobile devices. Thus, we adopt the Mobile First (MF) philosophy and examine the Instagram social network as an app intended for mobile use. The term MF was introduced by Luke Wroblewski (2011) in his book *Mobile First* while he was a product manager at Google. This design approach involves initially designing digital products for mobile devices and then progressively adapting them for larger desktop screens (Interaction Design Foundation, 2016). The goal of MF is to optimise user experience (UX) on mobile devices.

The design of IA and the corresponding navigation between information units on a mobile device involves organisational challenges that necessitate specific resources and navigation methods to optimise the UX on small screens. According to Sarah McClanahan (Apple, Inc., n.d.-d), a designer on Apple's Evangelism Design Team:

"A classic navigation from UI to UI via a tree-like IA is not advisable on a mobile device. Navigating from one interface to another and through deeper levels of navigation will leave important parts of the overall navigation inactive (see Figure 9.1 and Figure 9.2). Returning to these disconnected information units from a deeply nested UI involves long navigation paths, which may lead users to abandon the app due to the effort required" (Apple, Inc., n.d.-d).

To address the navigation challenges through the IA of an app on a mobile device, it is recommended to use the following three resources: Tab Bars, Push-In Navigation, and Modal Windows, as well as nesting information units of different hierarchical levels within a single UI (Apple, Inc., n.d.-d).

A Tab is represented by an icon that provides access to a main group of content (Google Ireland Limited, n.d.-b). Tabs are used to organise groups of related content that are at the same level of hierarchy or navigation (Google Ireland Limited, n.d.-b). Ideally, an app should have as few Tabs as possible, and these Tabs should be accessible in the main UIs of the app (Apple, Inc., n.d.-d). Tabs are visually grouped in what are called Tab Bars (Apple, Inc., n.d.-g). Each Tab within the bar represents the highest level of navigation for the group of information or content it represents. According to Sarah McClanahan (Apple, Inc., n.d.-d), "The Tab Bar represents the highest level in the information hierarchy of an app". Tab Bars (Figure 9.1) "are a global navigation controller that is located at the bottom of the screen and categorises the content of an app into different sections" (Apple, Inc., n.d.-d).

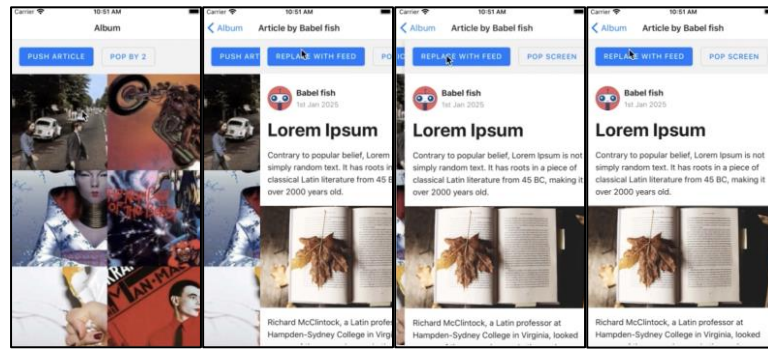
Google, in its Material Design framework, distinguishes between Primary Tabs and Secondary Tabs. Primary Tabs are those described above, while Secondary Tabs appear in navigation levels contained within those described by the Primary Tabs and are used to re-classify the information within blocks (Google Ireland Limited, n.d.-b). Google notes that the correct location for Secondary Tabs is at the top of the screen (Google Ireland Limited, n.d.-b). On the other hand, Apple, as stated by McClanahan (Apple, Inc., n.d.-d), specifies that the correct location for Primary Tabs, included within a Tab Bar, is at the bottom of the screen, and the Tab Bar should be visible in the main UIs of the app.

Modal Windows are used for executing task workflows. A Modal Window (MW) or simply a Modal, is a floating interface that emerges to guide users through a task step-by-step (Apple, Inc., n.d.-d). The MW interface features an "X" in the upper left corner, allowing users to close it and cancel the current task at any time. When the MW is closed, users return to the UI from which the task was started. The use of MWs is justified when a change in the type of content displayed is required, as they appear over a single UI to prevent users from scrolling through interfaces at different navigation levels (Apple, Inc., n.d.-d).

Generally, MWs are employed for executing both simple and complex tasks or for viewing specific types of content, such as articles, videos, or full-screen content, which require minimal navigation controls (Apple, Inc., n.d.-d).

Push Navigation, or Push-In, involves loading a new interface on a mobile device to display specific content, accessed by interacting with a component in a previous interface. This new content appears by scrolling from right to left on the screen, overlaying the first interface, and allowing users to return to the original or previous interface via a small return link (React Navigation, n.d.). Figure 8.1 exemplifies the transition of content on a mobile screen via Push Navigation. Push Navigation is an intuitive and recognisable method for users to navigate deeper into the IA of an app (Apple, Inc., n.d.-d). Users are familiar with this technique and expect to see its characteristic on-screen transitions when seeking more detailed information and navigating through hierarchical levels of information (Apple, Inc., n.d.-d).

Figure 8.1. Content Transition with Push Navigation



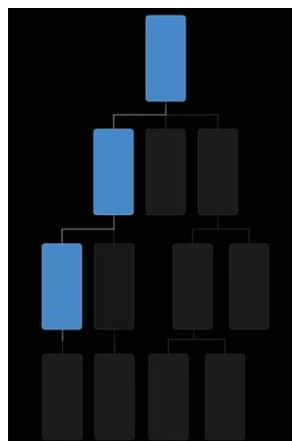
Source: Frame-by-frame version of the animated preview image. React Navigation, 2022.
 url: <https://reactnavigation.org/docs/stack-navigator/>

The use of Push Navigation is recommended for articulating scrolling between different levels of the IA, being particularly effective in facilitating frequent content transitions. A best practice when employing Push Navigation is to ensure that the app's Tab Bar remains visible and accessible at the bottom of the screen. This approach maintains consistency in navigation transitions. Mobile messaging apps serve as good examples of the efficient use of Push Navigation (Apple, Inc., n.d.-d).

In summary, Push Navigation and Modal Windows are the two recommended navigation forms for mobile apps. The choice between them depends on whether the goal is to facilitate easy and convenient navigation between information units at different IA levels or to avoid scrolling between levels.

Nesting Content that resides on different levels of the IA mental map within a single UI is an effective strategy to reduce the number of navigation levels. This approach prevents user movements between levels that could temporarily render entire blocks of content inaccessible and necessitate returning to previous levels to access the information again (Apple, Inc., n.d.-d). Figure 8.2 illustrates how information units become deactivated when navigating to lower IA levels. The nesting of content supports Allen's (2018) concept of IA, which includes the organisation of content within the UIs of a digital product. As Allen (2018) suggests, the number of contents that can be nested in a UI is virtually infinite due to the endless scroll down, extending beyond the screen dimensions. When Nesting Content from different navigation levels within the same UI, it is best practice to arrange them according to their hierarchy. Scrolling to the details of each nested content is efficiently managed with Push Navigation (Apple, Inc., n.d.-d).

Figure 8.2. Disabling Direct Access to Units of Information When Navigating to Deeper Levels in IA



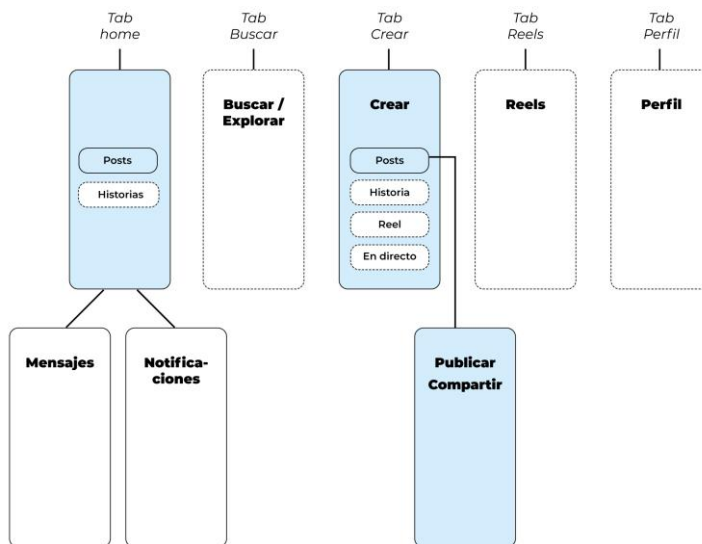
Source: Apple, Inc., n. d.n.-d

All the resources described in this section aim to minimise the number of steps required to navigate between different units of information in a mobile app, reduce navigation levels in the IA structure, and

use the fewest possible steps for task execution by the user. Employing Tab Bars, Modal Windows, Push Navigation, and Content Nesting is essential for delivering a good user experience.

Figure 8.3 illustrates the simplicity of Instagram's IA, which incorporates the resources outlined above. It features five blocks of distinct content accessed through the corresponding Tabs. The content of the IA examined and validated through the user journeys in this research are highlighted in colour and detailed in the following section.

Figure 8.3. Partially Verified Instagram IA



Source: Author(s) elaboration, 2023.

9. User Pathways Under Study

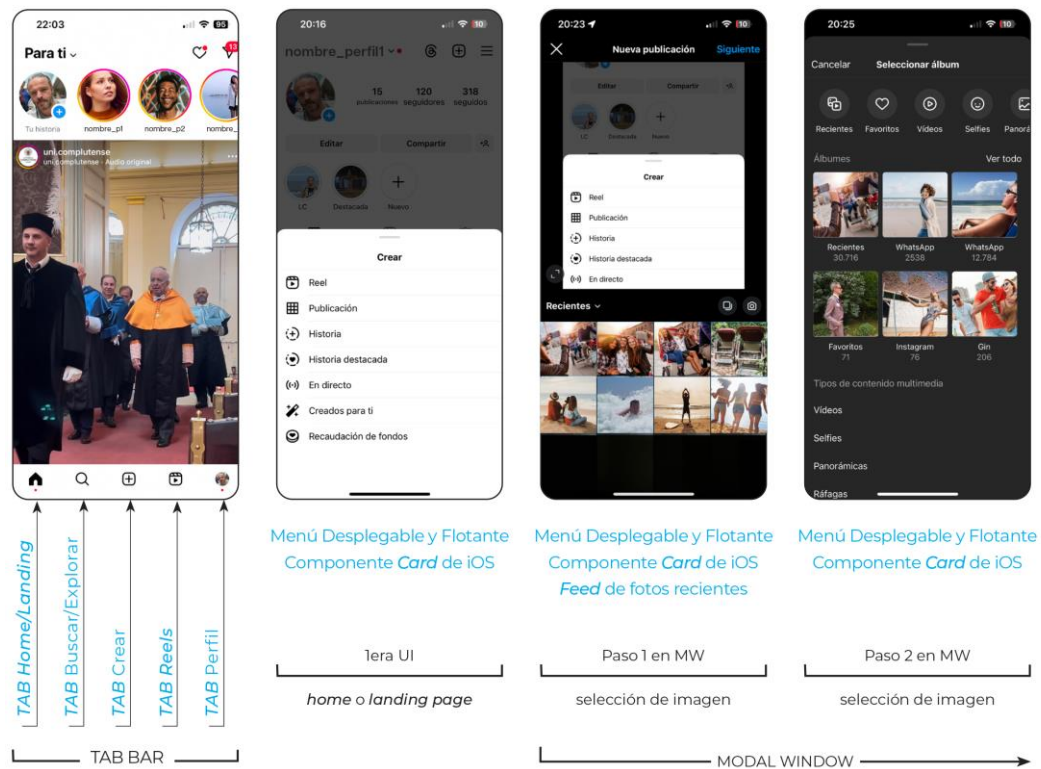
9.1. Tour of Content Publication

The screens that a user of the Instagram social network encounters from the moment they access their account until they publish content are shown below, in successive order.

The first screen the user encounters is the landing interface (Figure 9.1). From this UI, through the Tab “Create”, represented by a square with rounded corners and a “+” sign, located in the Tab Bar at the bottom of the screen, the user can access the content creation options available on the social network. This is done through a floating drop-down menu that simplifies the task of choosing the type of content to publish. This menu appears in the visual form of the card component, a feature of the iPhone's iOS operating system (MacStories, n.d.), in the lower half of the second screen. Among the seven content formats available for publishing shown in the menu, “Publications” is the simplest type. After making this selection, the task of publishing content continues in a Modal Window (MW) that occupies the entire screen. As illustrated, the MW features a cross in its upper left-hand corner, allowing it to be closed at any time. This action cancels the content publication task and returns the user to the home or landing UI without requiring navigation through several levels.

In the MW, a sub-window or frame is displayed in the lower half, allowing the user to select one of the most recent images from their mobile device's photo album. Selecting an image advances the user to step 3 of the MW (Figure 9.2). Alternatively, clicking on the “Recent” drop-down menu displays the full screen as step 2 in the MW (Figure 9.1). If this Floating Menu is closed, the MW described in the third screen reappears. In the Floating Menu or Card, users can choose newer or older content by browsing through the photo albums available on their mobile device. Additionally, the categorisation of images in the photo album is visible and accessible through Nested Navigation at the top of the interface, where content types are displayed in succession.

Figure 9.1. Instagram Posting Journey (Part One)



Source: Author(s) elaboration based on authors' profiles and public profiles followed on Instagram, 2023.

Once the image to be published has been selected, whether from the most recent images or by navigating further to choose by albums or image type, the user reaches the Modal Window “New Publication” to confirm the chosen image (Figure 9.2). In the first screen of this figure, the selected image appears within the MW, alongside the sub-window of recent photos previously seen (Figure 9.1), allowing the user to change the selected image if desired. If the user is satisfied with the selected image, they must confirm their choice by pressing the “Next” link located in the upper right-hand corner of the MW, as shown in the first screen of Figure 9.2. This confirmation step ensures that an image selected by mistake is not published. After confirmation, the MW transitions to the next step in the publishing task, “Image Editing”.

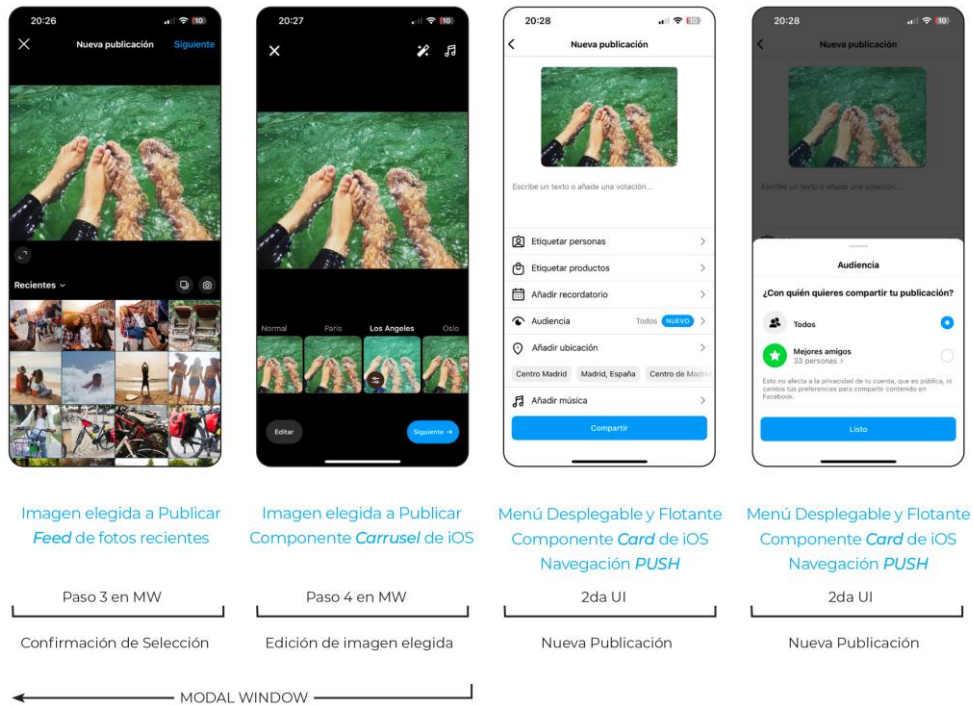
On the second screen, a menu in the upper right corner provides two secondary tabs for adding text and music. At the bottom of the screen, a carousel of images illustrates various automatic retouching effects available for the chosen image. This carousel serves as a visual menu, a common feature of the Instagram app. Selecting an effect from the carousel applies it to the enlarged image displayed on the same screen. The “Edit” and “Next” buttons are positioned at the bottom of the screen. The “Edit” button takes the user to a step for making typical photographic adjustments, following the same interaction design as described above. Clicking “Next” advances the user to the final step in the publication process, visible on the third screen.

This last step appears more like a user interface rather than a typical MW screen. It allows users to return to the previous step of the task using the “<” option in the upper left corner (Apple, Inc., n.d.-e), resembling Push Navigation. The absence of the application's Tab Bar at the bottom makes this screen appear as a distinct MW rather than a standard UI. The “New Publication” interface provides access to the final configuration options for the publication. Choosing each option leads to its corresponding screen or Floating Menu, which can be exited to return to the “New Publication” screen. Once all final settings are made, the user simply selects the “Share” button to complete the publication.

The revised multi-step task of publishing content begins with a Floating Menu or Card (Figure 9.1). This menu leads to a Modal Window (MW) where the steps of selecting the image, applying filters, and making adjustments are carried out (Figures 9.1 and 9.2). Once the image has been confirmed, access is granted to what appears to be a UI for configuring the publication details containing the image (Figure

9.2). Completing this task involves navigating through two levels of navigation. The first level starts on the home page with the MW, which does not require an additional navigation level. The second level is on the publication details configuration interface, as shown in the third screen of Figure 9.2, from which the user can return to the previous MW. Upon finalising the publication, the user navigates back through a Floating Menu (Figure 9.2) and returns to the home page of the app.

Figure 9.2. Instagram Posting Path (Part Two)



Source: Author(s) elaboration based on authors' profiles and public profiles followed on Instagram, 2023.

9.2. Content Viewing Tour

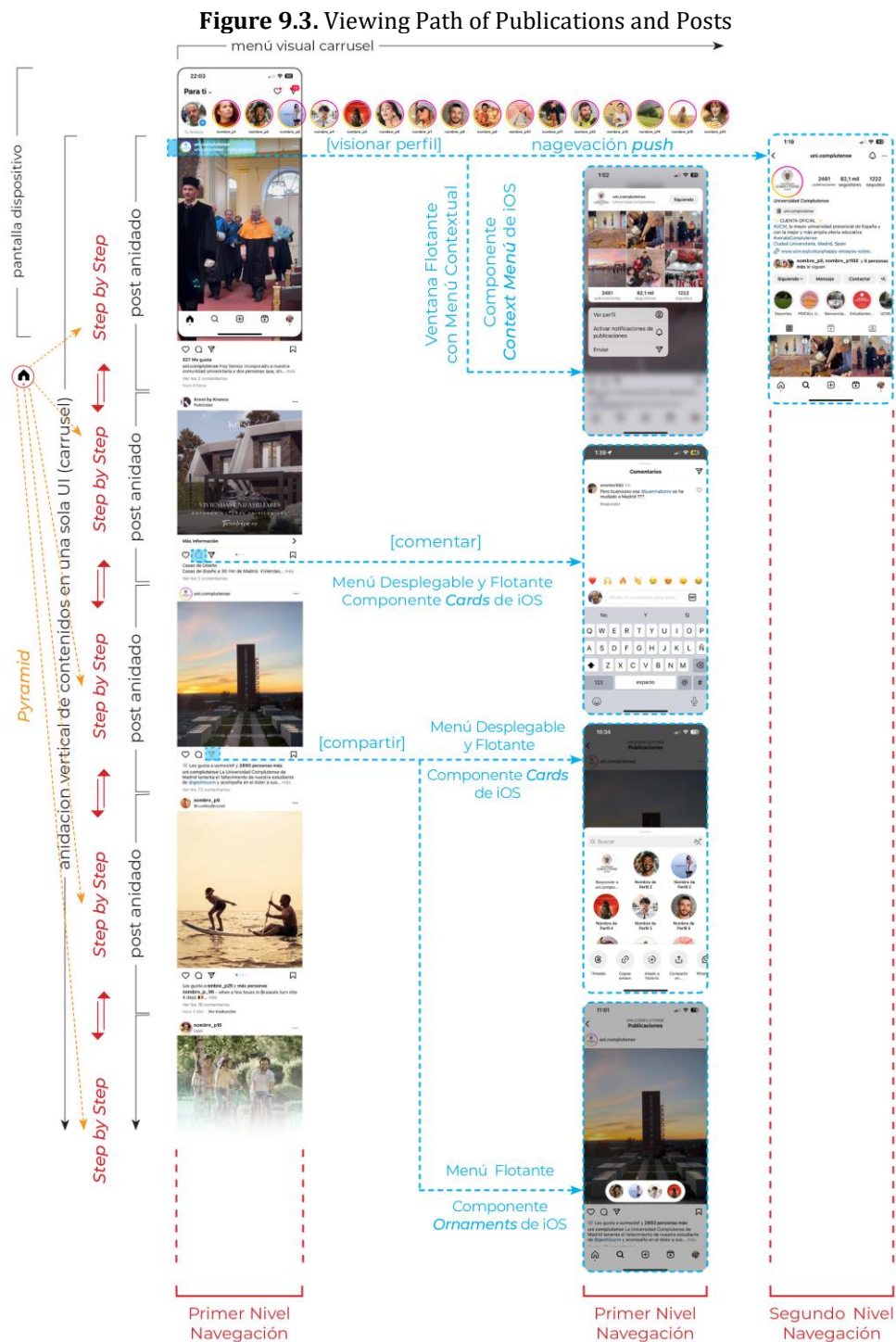
When accessing the Instagram Application, a carousel appears at the top of the landing page “Home”, situated below a menu of secondary tabs of “Likes” and “Messages” (Figures 9.1 and 9.3). This carousel showcases images from profiles that the user follows. Scrolling left to right through the carousel allows users to view all followed accounts. This setup employs a pyramid IA, providing access to all followed user accounts on the same second level of navigation within the IA hierarchy. Clicking on any image in the carousel grants access to the content published as a story by the corresponding profile in the past 48 hours (Figure 9.3).

Below the menu with images in the form of a carousel, a timeline appears, showing the most recent posts published by the accounts or profiles followed. All posts are accessible by scrolling vertically on this first level of navigation. This use of nesting, with infinite units of information “Posts or Publications” in a single UI, prevents the need to access a second, deeper level of navigation to view each post. It also avoids the need for scrolling between different interfaces at varying levels of navigation, as noted by McClanahan (Apple, Inc., n.d.-d). This configuration represents a Pyramid IA that provides access to all posts at the same first level in the app's content hierarchy. The timeline of posts acts as a step-by-step navigation through the different posts, functioning similarly to a pseudo-carousel from top to bottom, without requiring navigation between different interfaces.

The interaction actions available to the user for each post include liking, commenting, sharing, and viewing the profile that published the post. Except for liking, which updates a counter within the post, the other actions utilise menus and floating windows to avoid requiring users to scroll to a second level of navigation. The “Comment” and “Share” actions open drop-down and Floating Menus, while the “View Profile” action opens a floating window with its own context menu. Figure 9.3 illustrates the use of the Cards component, a feature of the iPhone iOS operating system (MacStories, n.d.), for the “Comment”

and “Share” actions. The Context Menu component of iPhone iOS (Apple, Inc., n.d.-c; MacStories, n.d.) is used for the “View Profile” action.

It is worth noting that the “View Profile” action can be performed by interacting with either the profile image or the profile name, both located in the upper left-hand corner of the post. If the profile image is tapped, the interaction proceeds as described above. If the profile name is tapped, the user is directly taken to the UI of the corresponding profile’s home or landing page. In this case, the user navigates to a second level of the Instagram IA hierarchy. However, this profile UI adheres to Apple’s Push Navigation recommendations and features a link (symbol "<") in the top left corner, allowing the user to return to the previous navigation level (Apple, Inc., n. d.-e).



Source: Author(s) elaboration based on authors' public profiles and public profiles followed, 2024.

In conclusion, the user navigates primarily on a single level or, at most, two levels, depending on the type of content. Posts are displayed on the first level of navigation within the Instagram IA, allowing users to view all posts directly from the home or landing interface. Only content types such as stories or reels require accessing a second level of navigation. For viewing and publishing content, deeper levels of navigation are not necessary.

9.3. Resources and Techniques for IA Design and Navigation in Apps That Optimise the UX, As Used by Instagram.

In addition to the resources described in Section 8, it has been observed that the Instagram social network employs certain standard components to optimise IA design and user navigation. These resources include Drop-Down and Floating Menus (DFM), Floating Windows (FW) with Contextual Menus (CM), and Carousels.

DFMs, as illustrated in Figures 9.1, 9.2, and 9.3, are used to cover part or all of the screen to execute a single task or a step in a series of tasks. They are designed to prevent scrolling through different levels of IA and are utilised both in UIs and within MWs of the app. On an iPhone, these DFMs appear as the Card component, created by Apple for its iOS operating system (MacStories, n.d.). Instagram also employs the iOS Ornaments component (Apple, Inc., n.d.-f), a more compact version of the MDF, as shown in Figure 9.3, where the Ornaments present a reduced set of options compared to the larger Card component.

Floating Windows (FW) with Contextual Menus (CM) serve a similar purpose as Drop-Down and Floating Menus (DFM), aiming to execute a task without navigating to deeper levels in the IA. These consist of a floating window that appears on the screen with an accompanying menu for selecting the next action to be performed.

Carousels are sequences of items that can be scrolled in or out of view by swiping across them (Apple, Inc., n.d.-b; Google Ireland Limited, n.d.-a). The extensive use of Carousels throughout the Instagram App highlights their role as a key navigational resource. They contribute to the app's visual dynamic, as evidenced by their prevalent use in user journeys. Carousels facilitate scrolling between images, serving various functions such as visual menus that allow users to preview content at the next navigation level without fully accessing it. They also help navigate between nested units of information within the same interface, as seen in the timeline of posts on the home page or assist in selecting visual effects for images by displaying successive modifications to the chosen image.

10. Conclusions

The development of our research allows us to formulate the following significant conclusions that respond to our objectives:

- Instagram employs standard models and patterns in its information architecture (IA). Specifically, it utilises a combination of the typologies documented by Tidwell et al. (2019): Tree or Multi-Level, Step-by-Step, and Pyramid.
- The IA is organised as a Tree with only two navigation levels. The Pyramid typology is used to present similar contents (such as Posts and Photo Albums) within the same level of the Tree IA. The Step-by-Step typology facilitates navigation between these similar contents.
- Apple's recommendations are followed to optimise the user experience (UX), incorporating Push Navigation, Content Nesting, Tab Bars, and Modal Windows.
- The navigation recurrently employs components such as Carousels, Drop-down and Floating Menus, and Floating Windows with Contextual Menus.

The design of Instagram's IA aims to minimise navigation levels and avoid, where possible, scrolling between interfaces located at different levels. By employing the Step-by-Step and Pyramid typologies within the main hierarchy, information units connected to each other are arranged on a single horizontal navigation level. This approach prevents the creation of deeper levels in the IA, a goal further achieved through the nesting of similar information units in the same UI, as seen with the Posts.

Navigation is optimised by significantly reducing the need to scroll between UIs at different levels. Push Navigation facilitates returning to the previous navigation level. The inclusion of Tab Bars in the

application's UIs offers a shortcut through the various navigation levels. Modal Windows (MW) are utilised for multi-step tasks or task execution processes (Task Workflows), while Drop-Down and Floating Menus (DFM), and Floating Windows with Contextual Menus (FW with CM) assist in executing tasks or simple actions without requiring navigation between different interfaces or levels. The extensive use of Carousels enhances the visual appeal of the app and aids in navigating between information units at the same level of the IA, as seen in the home timeline.

In conclusion, the design of the IA and navigation in the Instagram social network demonstrates adherence to the fundamental principles of the Mobile First design approach, as defined by the Interaction Design Foundation (2016):

- Keep it simple, with navigation containing only the essential elements.
- Establish a visual hierarchy to clearly indicate the most important content.
- Optimise text for visual scanning; users scan more than they read on mobile devices, so keep paragraphs short, with a maximum of two or three sentences.
- Avoid Hovers, as they are not readable on mobile devices; use contact gestures and sliders instead.
- Refrain from using complex graphics or images typical of desktop versions.
- Design for fat and thick fingers; avoid small and thin Tabs.

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