Galaxy Tab S6 Lite vs. Apple iPad Air: Comparing the Human Factors

An essay by Reed Meher | 310 | 1/30/2024

INDEX

Goal Statement and User Story

The goal of this essay is to compare the interface and human factors of the Galaxy Tab S6 Lite with the Apple iPad Air so that I can tell you about how these tablets function and how I rank the experience of using them. To achieve this goal, I will be comparing three tasks.

As a tablet user I want to:

1. Establish the default privacy settings on the tablet and make sure the tablet is in a safe state.
2. Set the battery settings for optimizing battery life or performance.
3. Use a native pen/pencil tool to create a new note that allows me to input handwritten text and draw images; to write by hand with the pen tool and then convert the pen input to text.

So that I can understand some basic tasks that I believe are essential to the tablet experience.

In this study, I will only use the note app native to each tablet. There will be no extra downloaded software or changes to the settings before the testing; everything will be set to default. Both tablets are running on the latest operating system available to them. To note: The Galaxy Tab S6 comes shipped with its native Pen tool. The iPad Air has a native Pencil tool, but it doesn't ship with that tool, rather it

must be purchased separately. I decided it was still fair to test the Apple Pencil tool against the Galaxy Tab Pen tool because:

- The Apple pencil is formatted to work specifically with the iPad Air as much as the Galaxy Tab Pen is formatted to work with the Tab S6 Lite. They are both first-party peripherals.
- The primary advertising point for both tablets on their respective landing pages focuses on the Pen/Pencil integration. Integration with the Pen/Pencil tool is a top-billing feature.

For the reasons above, I decided it was prudent to test out the Pen and Pencil so that I could best understand the tablet experience heralded by Samsung and Apple.

About the Tablets

According to Samsung, The Galaxy Tab S6 Lite is "your super carryable note-taking, go-getting companion. It comes with a large 10.4 inch display on a slim and light build, One UI 2 on Android, and S Pen in box and ready to go. Whether you're drawing, learning or gaming, this is the tablet made to be in the moment."

Apple describes the purpose of the iPad as "more than up to any task. Whether you're working on a project, expressing your creativity, or playing an immersive game, iPad is a fun and powerful way to get it done."

From Samsung and Apple's descriptions of their respective tablets, I surmise that the purpose of both tablets is to be an effective, daily tool that can be used for entertainment, as an aid for meeting work or school goals, and artistic expression.

Expected Function of the Tablets

As both these tablets promise to be tools that can aid me in my entertainment, creative, work, and school goals, I expect several things from both tablets:

- Ease of use and clarity of how to operate. As a tablet user, these devices shouldn't require a lot of research and time to learn how to operate.
- Compatablity with supplemental devices. Since these tablets can go with me anywhere, I expect to be able to connect Bluetooth headphones, of any brand, to both tablets easily and reliably.
- Ample Battery Life and battery life saving settings. As a tablet user who wants the device to be with me for a day of work, school, and some down time to watch a show or play a video game, I expect my tablet device to be able to keep enough charge to last for a whole day.
- Easy to understand and set up Privacy settings and user account.

Intended User Population of the Tablets

Both Samsung and Apple seem to be focusing their advertising attention on students, creatives, and working professionals, though Apple also seems to be focusing on an environment-minded audience, while Samsung doesn't seem to be considering the environment-minded audience.

Apple, throughout their "Why-iPad" page, show examples of artwork made on the tablet, notes taken on the tablet, collaboration with others on planning trips or making projects, creating music, designing in 3D, etc. After advertising the how the iPad can be used as a work or school tool, they then advertise its excellence as a media-streaming device, photo editor, and plug its native video-communication app, FaceTime. After that, they plug the App Store and Apple Arcade and express that there is a great volume of third-party apps and games that you will have exclusive access to as an Apple iPad user.

Samsung's landing page for the Galaxy Tab S6 Lite closely mirrors that of the iPad Air, at least initially. It also focuses on pitching the usefulness of the device to students, working professionals, and creatives. It promises its effectiveness in creating notes and works of art, photo editing, and gaming. A point of departure for the Tab S6 Lite, is that Samsung focuses on security and accessibility of the device; accessibility and privacy is mentioned on iPad's landing page, but you must click on links to get detailed information. Samsung bullets much of the information about privacy and accessibility on the S6 Lite landing page.

Given the nearly exhaustive similarities in advertising focus between the two devices, the biggest difference in who the tablets are targeting for their user population may be found in the only promise found on one tablet and not the other: Apple promises that, as a company, they are carbon neutral. They state that by 2030, all their products will be as well. As of the writing of this essay, Apple does not comment on if the Apple Air is carbon neutral, or if the device is made of any recycled and/or renewable materials. However, if you dig a little deeper by following a link, scrolling to devices, and finding and downloading the PDF on environment impact for the iPad Air (5th Generation), Apple states that the enclosure is 100% recycled and the packaging is 100% wood fiber that "comes from recycled and responsible sources". There are several more points listed on how the iPad Air is doing on it's Apple designed "Product Environmental Report", but for the purpose of this essay, I think I've covered enough to surmise that Apple is targeting a user population that feels strongly about issues related to the environment.

Samsung does not have any data related to protecting the environment or the manufacturing and engineering considerations they made regarding protecting the environment on the tablet's landing page. I cannot surmise they are targeting a user population that is considering environmental impacts when deciding which tablet to purchase based off the information on the tablet's landing page.

My Experience with the Tablets

What I liked about the tablets

Overall, both the Galaxy Tab S6 Lite and the iPad Air were enjoyable to use. Even though navigating around on the tablets has some very big differences, navigating around the menus and apps on the tablets and interfacing with the native software was generally natural and intuitive. Using the Pencil tool on the iPad was the clear winner for me. Initially put off by the interface of the Notes app, I soon lost all track of the interface and spent almost an hour sketching with the Pencil. Initially, it doesn't feel like there is much difference between the Apple Pencil and the Samsung Pen, besides the vast cost difference, but as a person who loves to draw, it soon became clear how much more enjoyable, pleasing, and nuanced the Apple Pencil experience was. It was just delightful to draw with that Pencil, even in a so-so Notes app. If you just like to write quick notes, though, the Samsung is the clear winner because it works great and costs so much less money. Plus, it is even included with the tablet.

I enjoyed the size of both tablets, but for different reasons: I liked the shape and weight of the S6 Lite when it came to holding the device in one or two hands. It has a sure feel, and I liked reading on the tablet. The iPad Air has a more beautiful display and felt especially good when held with both hands. The shape and feel of its materials made me feel like I was holding something sturdy and strong. I say the display on the Air was more beautiful because of the experience of it. I am sure there is technical details about why it looks nicer, but without delving into technical details I like the display on the Air because the colors seemed rich and the screen felt easy on my eyes whether the brightness was set high or low, and reading on it was easy regardless of brightness – I felt little to no eye fatigue after reading an article that was black text on a white background.

The display on the Air in its default adaptive light settings was also really, really, nice. When the screen adapted by increasing or decreasing brightness based off relative lighting around me, it transitioned gradually to the new levels, and the levels always seemed to match the environment in a way that felt favorable to my eyes.

I liked that both tablets loaded quickly and finding tutorials to use the hardware and its native software was easy to find and easy to understand with well written instructions and good supporting images or animations modeling the functionality of the native hardware and software.

What I didn't like about the tablets

While the Galaxy Tab S6 Lite had menus that were easy to navigate, I didn't like the level of customization and options in settings. There were so many nested advanced options in most of the categories, especially the battery settings, privacy settings, and Bluetooth Settings. With so much customization, my bias and experiences are, that it is easy to lose track of all the things you have modified and how all those changes will affect different settings. Less subjectively, the many settings options create a more tangible problem: I was able to set several detailed battery preferences, but I couldn't find anywhere to modify or silence the "sound effects" the Pen tool makes to mimic real pencil sounds. While that was a novel touch at first, after 10 minutes of writing it was driving me nuts.

Regarding the iPad Air, I was annoyed initially by the volume of "intuitive" gesture commands and force pushes. I found it was much easier to figure out how to use the tools and functions of the native note application on the Galaxy S6 Lite because things were easier to find, and the icons were more obvious and plentiful. Even though the iPad Air gave me a brief, concise overview of the functionality of the native note app when I loaded it up for the first time, I quickly forgot most of the tips. It was difficult to find the handwriting-to-text tool, difficult to find the undo tool, and difficult to figure out how to start a new line when doing handwriting-to-text without inadvertently setting in motion several formatting features that are also initiated by where and how you put pressure on the screen.

Interestingly, the thing I like least about one of the tablets I discovered while writing this essay: the name of the Galaxy Tab S6 Lite. I had to keep a window open with the full name of the product to make sure I wrote it correctly each time in this essay. If you include the brand, it is the Samsung Galaxy Tab S6 Lite, which has more characters than the VIN on my car. In comparison, the whole name for the other tablet I tested is the Apple iPad Air. Easy to remember, easy to say, and I never wondered for a moment "what is the name of this device again?".

Human Factors Concepts

Gulf of Execution

Gulf of execution measures a conceptual distance between a goal and what it takes to achieve that goal. It considers several factors: the user's goal, the user's intention, and the action, or actions, that need to be taken to achieve the goal.

To understand this better, let's look at an example. Let's say you want to delete a note from your tablet. Deleting the note is your goal. The intention is that you will use the note app to find the target note. The action is what you must do to delete the target note. If the gulf of execution is *narrow*, you will readily see your note and there will be a recognizable icon next to it that directs you to delete it. If the Gulf of execution is *wide,* perhaps when you click on the note there will be a series of icons that are or aren't clear right away; when you deduce which one to select, you are met with another menu with multiple options; maybe you will have to read all of them and not know which one you click is what you are looking for, so you select the "MORE" option. There you find more options and see the delete note option.

When the gulf of execution is wide, you start to alienate users, even if it is just by a tiny bit. If there are many wide gulfs of execution, the overall experience with the device is frustrating and alienating for users. Therefore, each task on a tablet should try to have as narrow a gulf of execution as possible to keep users engaged and satisfied with the experience.

Gulf of Execution: Interacting with Privacy Settings

Galaxy Tab S6 Lite

My goal was to check privacy settings and make sure my tablet was secure on both tablets. There was not a settings app icon on the home screen of the Tab S6 Lite by default, nor a soft or hard button (soft buttons are the clickable icons on the screen, hard buttons are mechanical buttons on the housing of the device), to click to access settings. I experimented with swiping up and down, left and right on the tablet to see if I could find where the full list of apps and settings menus were. On my second and third attempts, I located the settings app. It could be found by either swiping one finger down on the screen from the very top of the device or swiping one finger up from the bottom of the device. By swiping down from the top, I recognized a small icon in the shape of what I recognize as a gear. From experience, I guessed that this icon meant settings were available by clicking on the gear icon.

By swiping up from the bottom, a list of all apps on the tablet was displayed, or at least that was my assumption about the contents of the new screen. I found the gear icon there as well, but it looked to be a square app shortcut that I could add to my home page on the tablet.

I didn't want to add a shortcut to settings, so I decided to click the gear icon from the menu that opened when I swiped one finger down from the top of the tablet display. Once clicked, I was at a new screen that had a list of options. The options did not appear to have a logical order at first, but I assumed that since they weren't alphabetical the list was probably ordered under most utilized settings. From my experience, the most used settings on my tablet are the account, Bluetooth, and wi-Fi settings; those were indeed the top 3 setting items in the settings menu on the Tab S6.

10 items down on the list, I found an option for “Security and Privacy”. It listed all the options I had related to Security and Privacy, and it was a list of about 12 options.

It wasn’t clear where the settings were, but it took me less than 3 adventurous interactions to find the settings. Based off my experience, I would say that the gulf of execution to find and interact with privacy settings was narrow. However, if I had never used a tablet before and was unfamiliar with swipe gestures, it may have been a much more difficult task. The tablet industry is probably safe in its reasoning that there are not many populations left in their target market who have never used a touch screen before. If their target audience had a low technical literacy, I would grade the gulf of execution as being too high, and that the default setting should have a tutorial app on the home screen as well as a clear shortcut to the settings.

Gulf of Execution: Interacting with Privacy Settings

iPad Air

On the default home screen, there is a square app icon with an image of a gear on it. Below the image, the text “Settings” is written. I clicked the settings app and a new screen with a list of options appeared. This list, like the Tab S6 Lite, seemed to be ordered by the most frequently used settings, not alphabetically. Privacy & Security was 18 options down on the list, which is 8 options further down the list than on the Tab S6 Lite.

When I clicked the Privacy & Security option, which was paired with a blue icon with a white hand with all its fingers pointed up and slightly spread apart, a list of 20 more options opened to the right of the panel with the main Settings options listed.

The gulf of execution for finding privacy settings was very narrow. The fact that the default setting had a clear hyperlink to the settings on the home screen meant I didn’t have to pause at all to figure out where to find the settings or familiarize myself with how to interact with the device.

Gulf of Execution: Setting Battery Life Settings

Galaxy Tab S6 Lite

I swiped my finger down from the top of the display and clicked on the gear icon in the top right. From the settings panel, “Battery and device care” was 17 options down from the top – the same distance down as that of the iPad Air’s battery setting option.

When I selected the Battery option, a new menu appeared to the right of the settings panel. There was a smiley face at the top with the word “Good” below it. Below the text was a blue button that read “Optimize Now”. Below that button were options that addressed learning my usage patterns, storage on the device, memory available, whether there were security threats present, and more options for optimization, software updates, diagnostics, and “Maintenance Mode”.

My goal was to optimize the battery life, so I clicked the blue button to “Optimize Now”. A new screen displayed to the right of the settings panel and the smiley face became animated, bouncing and thinking as a list of text points appeared one after the other with a check mark by them. It informed me that the battery had been optimized, but also that no malware was detected. I selected the blue “Done” button and was returned to the Battery menu.

I felt I had optimized my device when I clicked to Optimize Now, but I wasn't sure if I was still in some sort of optimized mode that gave battery life precedence over other functions or not. If there was another place to set the table to a low power mode, it wasn't in the battery settings. There was not an option to optimize or prioritize processor performance in the battery settings, so I was not able to test that goal.

Overall, the gulf of execution to enter a mode that prioritizes battery was very wide, because I could not ascertain if "Optimize Now" was temporary or ongoing; it is unclear if I executed my goal at all.

Since there was no "off" option after optimization, I surmise that the action was a one-time thing. I do not know if I can set the Galaxy Tab S6 Lite to a low power mode. The process of running an optimization, though, was very straightforward and satisfying. I liked that it made me feel like it was running a diagnostic and showing me in real time as it cleared each objective.

Gulf of Execution: Setting Battery Life Settings

iPad Air

I navigated to the settings menu via the settings app icon on the home menu. 17 options down on the list of settings, I found the Battery Option. I clicked the option and battery information was displayed to the right of the settings panel. From the top, there was a toggle option to display "Battery Percentage" and a toggle option that read "Low Power Mode". The Low Power Mode toggle was followed by a brief description of what Low Power Mode does and what it impacts when enabled.

Below the two toggles, a graph was displayed with the headed "Last 24 Hours" in the selected tab. There was a second, unselected tab that read "Last 10 Days". The graph showed me the battery level fluctuations through the day and last 10 days when selected. Below the usage graph, it displayed which apps were using battery life. The list was ranked by which apps were using the most battery life at the top and the ones using the least at the bottom.

My goal was to go into a low power mode to optimize battery, so I clicked Low Power Mode and the toggle moved to the right and the space to the left of it turned green. The only other change was that the battery icon in the top right of my tablet, the one that showed the battery level, turned from white to yellow.

The gulf of execution to enter a Low Power Mode was very narrow, and it took me no time to figure it out. However, there was not an option to enter a Performance mode that would sacrifice battery efficiency for computing power, so I was not able to test that goal.

Gulf of Execution: Using the Native Pen/Pencil Tool

Galaxy Tab S6 Lite

On the home screen and in the default app dock on the bottom, the first app listed looked like an image of a spiral bound notebook. I clicked the notebook icon and a new screen loaded. On the bottom right corner an icon of a pencil over a square, which I took to be representational of paper. I guessed this icon would create a new note, so I clicked it. A new, untitled note opened. The physical Pen tool was magnetically fastened to the right side of the tablet housing. I easily detached it and clicked on the icon at the top of the screen that looked like a paint brush. I was able to draw images on the new note. The Pen or tablet made a "drawing sound" as I created lines.

I next clicked the icon at the top of the screen that looked like a pen with a letter T under it. I guessed that clicking that icon would be the tool that translates handwriting to printed text. I clicked the icon and a blinking cursor appeared on the note. When I wrote words, printed or cursive, with the Pen they would soon appear at the blinking cursor as standard font text.

The gulf of execution was narrow to start a new note and implement the Pen tool. The note app was easy to find and recognize as well as the options to use the Pen with its various functionalities.

Gulf of Execution: Using the Native Pen/Pencil Tool

iPad Air

On the home screen of the iPad Air, I found an app that looked like a notepad with a yellow top and dark, horizontal lines. Below it was the text "Notes". I clicked on the Notes app and a menu loaded that listed folders and some other options. In the top right corner of the screen, there were four icons and one of them was a square with a pencil over it, which I understood to represent writing. I clicked the icon and expected to have a new note open. A new note did open with the onscreen keyboard at the bottom of the screen and a blinking cursor line at the top of the screen. There were about 9 icons at the top that seemed familiar, but my goal was to draw with the Pencil tool, then use the handwriting translation tool, so I looked for an icon that would match that.

I removed the Pencil which was magnetically attached to the right side of the tablet housing. The Pencil came off easily but noting changed on screen. I tried to draw on the screen without clicking anything, and I made an "M" shape. The line I drew appeared as I drew it on screen, but then it "flew off" and became a standard font, capitol letter M where the blinking cursor had been at the top of the screen and my drawing was gone. I didn't have to select anything to access the Pencil tool.

Next, I located an icon that looked like a pen tip and selected it. A new, oval panel was revealed, and it had various writing utensils illustrated, a small color palette, and a few more options. When I clicked on the tool that looked like a pencil, the pencil was animated to look like it was slightly pulled out of a box, mimicking pulling a pencil out of its case. I was able to draw pictures on the new note.

The gulf of execution was narrow to start a new note and implement the Pencil tool. The Notes app was easy to find and recognize. It was easy to understand the icons in the Notes app and select the options that met my goal of starting a new note and writing with the Pencil tool.

Gulf of Evaluation

The **Gulf of evaluation** is a concept that measures how easy it is to understand and determine actions, functions, and information about the device or system. For example: do you know when the device is loading data, if its memory is overloaded, if it is searching for a wi-fi signal, or if it is running out of battery? How do you know what state it is in and what steps need to be taken to figure that out? The Gulf of Evaluation measures how easy it is to know all about a device, or system, its current state, and how it's various components, menus, etc., are laid out so that you can successfully navigate the interface, find what you are looking for, and know the state of the machine.

Gulf of Evaluation and Interacting with Privacy Settings

Galaxy Tab S6 Lite

In the settings option for Security & Privacy, the top option was to "Turn on Device Protection". I clicked the top item and was prompted to enable device protection. There was an unchecked checkbox and a description that informed me what the device protection feature entailed, that it was currently turned off, and outlined what turning it on would do. There was a link to learn more about device protection. I recognized it as a link, because the text was a different color, it was underlined, and it read "learn more about device protection". I clicked the checkbox, it turned green with a white check mark, and the description below it informed me that now my device was protected. The link to learn more was still there, but it had added the text "No threats found".

I rate interacting with the privacy settings on the Tab S6 Lite as a narrow gulf of evaluation. It felt very clear what the system state was as it animated each step along the way and told me before and after what would and had happened to the state of the device during the process.

iPad Air

My goal was to check privacy settings and make sure my device was safe. It wasn't clear to me right away how to check the privacy settings or how make a change to them because there were so many separate options that didn't seem to pertain to the tablet overall. The first 3 options were "Location Services", "Tracking", and "Contacts". The language of "location services" didn't make me think about privacy settings. I had to scroll down to number 19 of the options to "App Privacy Report", which was the first setting that felt like it would cover things on a wider scale.

I clicked "App Privacy Report" and a new screen to the right of the settings panel opened. There was an image of what I recognized to be a shield, half green, half unfilled color with a green outline. Below the icon was the bold text "App Privacy Report". Below is a description of what the App Privacy Report was, a link to learn more, and a button to "Turn On App Privacy Report". I recognized the link as a link because it was a different color text than the description and the text "Learn more" was followed by a triple period, which I understand to mean that there is more information.

I clicked to turn on the App Privacy Report and the green shiel icon disappeared. It was replaced by a text box that read "Report information will appear here as apps are used." I understood this message to be a promise that once there was collected information, I would be able to come to this screen to see it. Below that new text box was a button that read "Turn Off App Privacy Report" in red text.

There was still a place at the top of the menu that summarized the functionality of the App Privacy Report and had a link to "learn more…".

At first, I had been unsure where to click in the Privacy & Security setting to learn about privacy, but in clicking through each option I discovered that I had a lot of ability to target certain apps and services and limit or expand on their access to my personal data, my location, or even my network. There was a clear Lockdown Mode as the 20th option and its functionality was very clearly defined.

The gulf of evaluation in looking at the privacy settings and trying to meet my goal of ensuring my tablet was safe took more time to familiarize myself with, so I would say the gulf of evaluation was too high. There was no summary or assistance in Privacy & Security to help me understand what the key safety and privacy settings might be I should look for would be. When I turned the Privacy Report function on,

the only information about the state that I was provided was that when information becomes available, it would appear on that screen. I didn't know for sure if the tablet was actively checking on the security of the device, or if it was waiting for some other interaction; did I need to open an app to get the system to check on safety? Did I have to open every app I use? I feel that the system left me with more questions than answers.

Gulf of Evaluation and Setting Battery Life Settings

Galaxy Tab S6 Lite

As described in the gulf of execution for the Tab S6 Lite, the gulf of evaluation for optimizing the battery was too wide. I didn't know whether the device was in an ongoing, power-optimizing state, or if I had merely triggered a one time clean up and security check when I clicked "optimize now". It was a narrow gulf of evaluation to know what the state of the system was after I clicked the button while it itemized all the state changes it was going through, but I couldn't ascertain the state after the optimization seemed to conclude, but maybe hadn't concluded.

iPad Air

The gulf of evaluation in setting the device to "low power mode" was very narrow. Though the phrasing didn't match my mental modal (I was expecting "optimize for battery life" or such and was initially dismissive of "low power mode"), the description provided for low power mode matched my mental modal and my goal of prioritizing battery life. When I turned low power mode on, the battery icon changed to yellow, which reminded me of the color for caution. That helped me understand the state of the device had changed to the setting I'd selected, and I trusted it was performing as promised.

Gulf of Evaluation and Using the Native Pen/Pencil Tool

Galaxy Tab S6 Lite

Using the native Pen tool provided a nice, narrow gulf of evaluation throughout the task. As I clicked on icons, I could see that the state had changed in ways I would expect. Clicking the handwriting-to-text tool brought a blink line cursor to the note, which I recognize as symbol that the system is ready to transcribe text input. When I selected the paintbrush tool, the cursor vanished, so I knew the system had changed and was no longer looking for text input.

iPad Air

The iPad Air had an excellent, narrow gulf of evaluation when operating the Pencil tool. The large tool bar that appeared when I clicked the familiar pen icon made it very clear to me that the device was ready to take input from my Pencil and made it clear that I had many tool varieties at my disposal. When I clicked a tool option, the animation of the tool slide a bit more toward me was very familiar and I knew the system had read my intentions and the tool was ready for use.

Mental Models

Mental models are sort of a Holy Grail in device and software engineering. Engineers want their products to meet the mental models of users. The mental model is a abstract and conceptual space that is tricky to arrive at because, while users may have many similarities, no two users are the same. Each user has a Mental Modal, which is to say an image or expectation in their mind's eye, about how something ought to look or perform based off that image or expectation in their mind's eye.

There are different kinds of objects that can help better describe what a mental modal is: **transparent objects** make obvious what their function is. It was difficult for Arielle in Disney's live action "Little Mermaid" to ascertain what a fork was, but she did not need Scuttle's help to understand what a mirror was or how it functioned. A mirror is an example of a transparent object, and it is very easy to resonate with a user's mental modal of a mirror, even if you deviate far in the design: If a mirror is present somewhere in the design, users will rarely have trouble matching the mirror to their mental modal of what a mirror is and does.

More difficult to match a mental modal to **opaque objects**. Opaque objects do most of their work "under the hood". A car for example: from outside, you can see what that it moves, but you can't see the, many, many things going on in the concealed engine and computer systems within. Computers and software programs are examples of opaque objects, so trying to get them to match the mental modals of users is often a difficult task. Much of what they do is hidden, so it takes work to make some of its workings known to the user.

Mental Models and Interacting with Privacy Settings

Galaxy Tab S6 Lite

Privacy Settings matched my mental modal on the Galaxy Tab S6 Lite. I expected to find an option in the system settings menu, and I did. In my mind's eye, I imagined there would be a prominent button or option in that privacy setting that would tell me how I could check on the safety of my device, which there was.

iPad Air

The iPad Air did not quite meet my mental modal. I expected there to be a more prominent option directing me to set or check the safety and security of my device, but no option stood out to me. The option of "App Privacy Report" didn't match my image of what an option to actively check my device should look like. I was focused on the device safety, but the option I was looking for stated it was concerned with Apps.

Mental Models: Setting Battery Life Settings

Galaxy Tab S6 Lite

The Galaxy Tab fell short of my mental model when it came to battery settings. I really thought there would be a button in the battery settings to set the device to optimize battery life above processing power or background app activity. I expected it so much, that I still feel like I must have just missed something, even though I read and click on every option.

iPad Air

The iPad Air missed my mental model by a bit, as its only optimization option was to enter a low power mode. This wasn't what I was expecting to find, though the function did meet my expectations of behavior: to favor battery life over background apps and performance benefits like a brighter screen.

Mental Models: Using the Native Pen/Pencil Tool

Galaxy Tab S6 Lite and iPad Air

Using the Pen/Pencil tools exactly matched my mental model on both devices. I expected there to be a native note app on the home screen by default. I expected the Pen/Pencil tools to seamlessly work with their respective devices, and the icons and functionality of the tools worked as expected.

Mapping

Mapping is a straightforward concept. If I were to draw you a map from your house to a new grocery store down the street, it would be a very poor mapping if I only drew a line with a few turns in, and no other point of reference. Where was the starting point, and where was the finish? Where was your house, the store? What street were you on? Where were the landmarks? You would likely be a loss, or at least it would take you a lot more time to figure out my cryptic map. Now, I add a square at one end of the line with a triangle on top of the square. At the other end of the line, I add a rectangle with small a small rectangle on its bottom line, within the rectangle, and smaller rectangles in a row to the right of the bigger inner rectangle. Now you probably have an idea of which is your house, and which is the store. Next, I add some landmarks: maybe there is a neighbor at the corner who has a purple house with a dog that is white with black dots who is often in the front yard. I draw the purple house and the spotted dog along the line, just before a turn, and suddenly the mapping looks very good.

Proper mapping satisfies users of devices and software because they can easily orient themselves and find their way to and from different destinations. Proper mapping is often described as **natural mapping**. Improper mapping is often described as **arbitrary mapping.** Arbitrary mapping makes things confusing, difficult, or frustrating for users.

Mapping Related to All 3 Tasks on Both Tablets

I have combined my assessment of mapping for all three tasks and both tablets to this one summary. In my experience of the tasks on both tablets, there were no issues with mapping, nor were there noticeable inconsistencies. There were some execution challenges with the Galaxy Tab, but once I found the setting menu, its location did make sense and the settings all followed a logic that was easy to follow, even if I was sometime slowed down by disparities between my mental model and the way options were articulated or arranged. The same holds true with the iPad Air. The mapping of settings, apps, and the tools within the note app all followed a logic that I was able to follow without much pause on my part. Both tablets were similar on the whole when it came to mapping. There were some anecdotal differences, but the overall logic of the mapping was consistent across both devices.

Semantic Distance

Semantic distance looks at how many steps it takes to accomplish a goal and compares that with the intentions of the user. For example, I want to optimize the battery on my tablet. How many steps do I have to take to accomplish that goal? If it takes me 10 steps, that is a big semantic distance.

Semantic Distance: Interacting with Privacy Settings

Galaxy Tab S6 Lite: Low Semantic Distance

There were 4 steps to navigating to the privacy settings on the Galaxy Tab:

1. Swipe the screen to get to a hidden menu
2. Click the gear icon

3. Scroll through the settings options
4. Select the Security and Privacy option

iPad Air: Low Semantic Distance

There were 3 steps to navigating to the privacy settings on the iPad Air:

1. Click the gear icon on the home screen
2. Scroll through the settings options
3. Select the Privacy & Security option

Semantic Distance: Battery Life Settings

Galaxy Tab S6 Lite: Low Semantic Distance

There were 4 steps to navigating to the battery settings on the Galaxy Tab:

1. Swipe the screen to get to a hidden menu
2. Click the gear icon
3. Scroll through the settings options
4. Select the battery option

iPad Air: Low Semantic Distance

There were 3 steps to navigating to the privacy settings on the iPad Air:

1. Click the gear icon on the home screen
2. Scroll through the settings options
3. Select the battery option

Semantic Distance and Using the Native Pen/Pencil Tool

Galaxy Tab S6 Lite: Low Semantic Distance

There were 3 steps to navigating to the privacy settings on the Galaxy Tab:

1. Click the notebook icon on the home screen
2. Click the icon with the pencil over the square on the bottom right corner
3. Start writing with the Pen

iPad Air: Low Semantic Distance

There were 3 steps to navigating to the privacy settings on the iPad Air:

1. Click the Notes icon on the home screen
2. Click the icon with the pencil over the square on the top right corner
3. Start writing with the Pencil

Articulatory Distance

Articulatory distance is more abstract than semantic distance and does a dance with a user's mental modals. It attempts to measure the user's ability to recognize the information in front of them so that they can complete their goal. This is easier to understand with an example: I want to use a pen tool on my tablet, so I look for something that looks like a pen. There is a short articulatory distance if I quickly spot an icon that looks like a pen; a pen that matches my mental modal of a pen, or some other familiar

drawing utensil. The articulatory distance is wide if I can't find any familiar icon, and it turns out the icon to meet my goals is an image of a cat smiling and holding a pen to its mouth, but I thought it was a cat drinking from a straw.

Articulatory Distance and All Tasks on Both Tablets

I had no trouble recognizing any of the icons on either tablet. The physical appearance of the apps and options all matched close enough to my mental models that they were instantly recognizable. The note apps both looked like a notebook or notepad of some kind; The pencil tool selectors both looked like pencils, pens, paintbrushes, etc. Before I clicked each object, I felt I had a clear idea of what would happen and was never surprised by the outcome: the outcome matched my mental modal and my expectations.

Affordance

When we measure an object's **affordance**, we are measuring how obvious all the possible actions and interactions are with that object. A basketball has great affordance. We know when we look at it that we can do any number of things with it, and when we hold it, we are right away drawn to its power to bounce and grip to our hands.

A "Dead End" sign is an example of **bad affordance**, though, I recognize that may be a subjective example. We are generally used to those sorts of signs in the USA. I say it is a bad example because recently my 8-year-old daughter asked me what was dead at the end and why was that sign there. I explained what the sign meant, and she professed being even more confused. She said that streets can't die, and it doesn't really end if you can just turn around. Aside from the potential allegory of life / Zen proverb hidden in her astute logic, her point was valid. Nothing about the sign makes any sense. There is no image to go with it, just the words "Dead End" which is not as universal as the word "STOP" or "NO ENTRY". She wanted to know if the dead would end on that road. The affordance is very low for that sign because it doesn't convey any real information on its own, not without a colloquial understanding of the concept of a "DEAD END".

Affordance and All Tasks on Both Tablets

Affordance was good in all three tasks on both tablets. While in Privacy settings on both devices, it wasn't always clear which setting met my goal, I could tell that I had many options and that each option pertained to some kind of security, privacy, or safety setting. I knew that by selecting through the options, I would find many settings I could interact with and learn about, which is what I expected to find.

In the Battery settings, I expected to see metrics and options related to the battery and how it was being used or could be being used. Both devices displayed metrics and listed options that clearly related to the battery, and I knew that I could monitor and interact with those functions.

While using the Pen/Pencil tool on both devices, the tool bars that populated the screen told me that I had many options for interacting with the note and for modifying the tool/functionality of the Pen or Pencil. I expected there to be a number of options and ways I could manipulate how the program would interpret the data provided by the way I moved my Pen/Pencil tool across the surface of the tablet.

On the iPad Air

Cognitive Load

Cognitive load looks at how much information a user can manage at any given time to accomplish a task, which is very similar to how we think about and measure memory in a computer. This is looking at the short-term, task-focused processing load a user generally must devote to completing a task. The lower the cognitive load, the better. Imagine a website tells you to check your email to confirm your new account. You go to -%your email, see the new message from the website, open the email, and click the button that prompts you to "confirm my email address now". Easy: that is a low cognitive load for that task. You don't really have to remember anything but to check your email for the new message. Everything else is laid out for you.

Now imagine that the website gives you a random six-digit temporary code. They direct you to go to another page, enter the code, but before you enter the code you need to go to your email. When you get to your email you have to check your junk mail because they informed you on the page that the message will always go to junk mail. You search for the message, but it is hard to find because it didn't come from the website you just created an account for. Rather, it came from a partner security company. You finally find it, and it gives you another 12-digit number that you will need after you click a link, go back to the other page that needs the six-digit code, submit that, than go to the other page and put in the 12-digit code… And the website tells you have 5 minutes to complete the entire task.

The example above probably stressed you out reading it. It is an example of an overloaded cognitive load because it is expecting you to not only have too many disparate steps in your mind at once, but it is also setting an unreasonable timeline for you to complete the overwhelming steps.

Cognitive Load and Interacting with Privacy Settings

Galaxy Tab S6 Lite and iPad Air

Cognitive load was light when it came to interacting with privacy settings on both tablets. I never had to keep more than one step in my head at a time.

Cognitive Load and Setting Battery Life Settings

Galaxy Tab S6 Lite and iPad Air

Cognitive load was light for managing battery life. For the Galaxy Tab, there was nothing I had to keep in mind during or after the optimization process, except maybe to check the battery status once a week or so. The same holds true for the iPad Air.

Cognitive Load and Using the Native Pen/Pencil Tool

Galaxy Tab S6 Lite and iPad Air

Cognitive load for using the Pen/Pencil tools was light, though it was a greater load than the any of the other tasks I tested. It was a greater load because I had to remember where tools were located, have an idea of how each tool functioned so I knew how to select the proper tool, remember the best ways to erase or undo a step, etc. Executing and remembering the more advanced features tool more memory and time to get used to, so between switching tools was when the cognitive load would increase a bit.

What Could be Improved

While the iPad Air Notes app grew on me over time, I think more could be done to increase access to tutorials and tips from within the app, especially when it comes to the Pencil integration. For the Galaxy Tab S6 Lite, they need to do something about the naming conventions for Samsung Tablets; they have gone into the deep end of bloated tablet names which makes the devices sort of forgettable. Other than that, I recommend they add a default settings app shortcut to the home page, as well as a tips/tutorials shortcut to help learn how to navigate an Android operating system.