Interaction Design

Design an Age-Appropriate Experience.

In the previous chapters, we introduced some challenges that designing for children involves in terms of user experience. We talked about the different stages of development of motor skills as these heavily influence the ability to interact with a device and limit or widen our interaction opportunities.

In this chapter, we'll take a deeper look into the interaction challenges (and opportunities) that we'll face when designing a children's digital product.

Children and Adult Users: Key Differences

One thing is clear: children think differently than adults. We will get a little deeper into this topic in the next section, but for the moment, let's just identify some macro-differences between children and adults that affect the interaction and overall user experience.
Kids Develop Very Fast

Both on a physical and on a cognitive level, kids develop quickly. Therefore, a product for a 4-year-old might not be suitable for a 6-year-old; hence, the age groups we have both on the App Store and Google Play Store where apps from children are categorized in intervals of 2 years, “Ages 5 and under,” “Ages 6–8,” and “Ages 9–11.”

Average adults, not affected by any cognitive or physical disability, have more or less the same capabilities regardless of their age. Sure, a person in their 60s might not have the sight of a 20-year-old, but a common banking, or music streaming, or messaging app will perfectly work for all the users despite decades of difference in their age.

Kids Are in for the Journey

As adults, unless we’re playing a game, we want our experiences with digital products to be as easy as possible. Imagine using a hotel booking website or buying a flight ticket online. You want things to be easy and intuitive, and you want to find the things you need as fast as possible to complete the task efficiently and without unnecessary headaches.

When kids use a digital product instead, they’re in for the journey, not the destination. They don’t plan to complete a particular task to get it done as soon as they can; they want to enjoy the experience and find interesting things along the way.

Between the starting situation and the endpoint, kids enjoy what we call micro-conflicts.

This idea is at the core of gamification, as we discussed in Chapter 5.

Children Have Less Experience

As we’ll see more extensively in the next section, children at these stages of development (from kindergarten to 6th or 7th grade; see the Piaget’s four stages of cognitive development later on in this chapter) can’t really predict the consequences of their actions ahead of time. They don’t have much experience in life, so they tend to be more trusting than adults. Our duty as designers is to make sure our young users will be in a protected and safe environment. This is one of the most important features we have to provide in our products, and we’ll inspect what this means in a dedicated section.

Regarding interaction with digital products, children have obviously less experience than an average adult. This means that many patterns we take for granted when designing interactions and interfaces for grown-ups are still obscure to children. Creating a mental map of a complex information architecture can be very frustrating, if not impossible, for them. Performing some gestures could represent a double challenge, the first one being to understand them, the second one perform them correctly. The lack of
experience with life, but with digital products in particular, makes children particularly vulnerable for what concerns privacy and safety, and exposed to frustration regarding interacting with interfaces.

Kids are not small-scale adults, they are different, and they need different usability guidelines. It’s important to notice, though, that many user experience (UX) principles that work for adults and make an experience easy and enjoyable are still valid for children. Consistency is one of these. You don’t want to confuse a kid by changing interaction or user interface (UI) component along the way, just like you don’t want to do that on adults’ products. Simplify the design and avoid cognitive overload is also valid for both kids and adults, and so on.

Table 7-1 summarizes the fundamental similarities and differences.

Table 7-1. Differences and similarities between children’s and adults’ UX (Data source: Nielson Norman Group)

|                                                                 | Children                      | Adults                        |
|-----------------------------------------------------------------|-------------------------------|-------------------------------|
| **Same**                                                       |                               |                               |
| Following UI conventions                                      | Preferred                     | Preferred                     |
| User control                                                   | Preferred                     | Preferred                     |
| First reactions                                               | Quick to judge app/site       | Quick to judge app/site       |
| (and to leave if no good)                                      | (and to leave if no good)     |                               |
| **Small difference**                                          |                               |                               |
| Willingness to wait                                           | Want instant gratification    | Limited patience              |
| Multiple/redundant navigation                                 | Very confusing                | Slightly confusing            |
| Back button                                                   | Used in apps and websites     | Relied on                     |
| prominent, but browser back button not used (young children)  |                               | Relied on (older children)    |
|                                                              | Relied on (older children)    |                               |
| Reading                                                       | Not at all (youngest children)| Scanning                     |
| Tentative (young children)                                    |                               |                               |
| Scanning (older children)                                     |                               |                               |
| Readability level                                             | Each user’s grade level       | 8th to 10th grade text for    |
|                                                               |                               | broad consumer audiences      |
| Scrolling                                                     | Avoid (young children)        | Some                         |
|                                                              | Some (older children)         |                               |
| Standard gestures on touchscreens (tap, swipe, drag)          | Large, simple actions (young  | Easy and well-liked           |
|                                                               | kids)                         |                               |
|                                                               | Easy and well-liked (older     |                               |
|                                                               | kids)                         |                               |

(continued)
Table 7-1. (continued)

|                  | Children                          | Adults                                                                       |
|------------------|-----------------------------------|------------------------------------------------------------------------------|
| **Big difference** | **Goal in visiting websites**    | **Getting things done**<br>Communication/community<br>**Exploratory behavior**<br>Like to try many options<br>Minesweeping the screen<br>**Real-life metaphors**<br>e.g., spatial navigation<br>Very helpful for pre-readers<br>**Physical limitations**<br>Slow typists<br>Poor mouse control<br>**Animation and sound**<br>Liked<br>**Advertising and promotions**<br>Can’t distinguish from real content<br>**Disclosing private info**<br>Usually aware of issues: hesitant to enter info<br>**Age-targeted design**<br>Crucial, with very fine-grained distinctions between age groups<br>**Ads avoided**<br>Yes<br>**Promos viewed skeptically**<br>\(\text{Promos viewed skeptically}\)<br>**Usually disliked**<br>Often recklessly willing to give out personal info<br>Unimportant for most sites (except to accommodate seniors)<br>

Cognitive Development

We introduced the stages of physical development and the skills associated with each one of them, but there is also another important variable to take into account: cognitive development.

Just like our muscles, also our brain evolves and develops over time when we grow up. The cognitive load that a 12-year-old can manage differs greatly from the cognitive load a 3-year-old can handle. All this has a great impact on the design of our product, affecting, for example, the interactions and the user interface components, not just in their styling but also in the components we can use.

Jean Piaget (1896–1980) was the Swiss psychologist who first recorded the intellectual development and abilities of infants, children, and teens and theorized the four stages of cognitive development in children.
Piaget's interest in the cognitive development of children found inspiration in his observations of his own nephew and daughter. These observations reinforced his maturing hypothesis that kids' brains were not just smaller renditions of grown-up minds.

Up to that moment in history, kids were, to a great extent, treated as smaller versions of adults. Piaget was one of the first to distinguish that how youngsters think is not quite the same as grown-ups do. Based on these observations, Piaget concluded that children are not less intelligent than adults, they think differently. Albert Einstein said about Piaget's discovery “so simple only a genius could have thought of it.”

The topic is huge, and it deserves way more pages and expertise than I can provide, but let's try distill the information we need for our design work and define some basic principles and best practices.

Piaget's four stages of cognitive development¹ are

- Sensorimotor (from birth through ages 18–24 months)
- Preoperational (toddlerhood (18–24 months) through early childhood (age 7)).
- Concrete operational (ages 7 to 12)
- Formal operational (adolescence through adulthood)

The ones we’re interested in for this book are preoperational and concrete operational. Piaget recognized that a few kids may go through the phases at unexpected ages compared to the midpoints noted earlier and that a few kids may show qualities of over one phase at a given time. However, he was sure that cognitive advancement consistently follows this grouping, stages can’t be skipped, and that each stage is defined by new intellectual skills and an increasing comprehension of the world.

### Preoperational Stage

During the preoperational phase that goes from 18 months to 7 years old, children are capable of using symbolic thinking, and this could help us, for example, when designing icons for them. Their language becomes more mature and sophisticated, and they also develop memory and imagination. This allows them to understand the difference between past and future and engage in make-believe activities.

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¹Cherry, Kendra. “What Are Piaget's Four Stages of Development?” *Verywell Mind.* Verywell Mind, 31 Mar. 2020. Web. 01 June 2020. <https://www.verywellmind.com/piagets-stages-of-cognitive-development-2795457>.
Their thinking, though, is still, for the most part, based on intuition and still not entirely logical. They cannot yet fully grasp more complex concepts such as cause and effect, time, and comparison.

Major characteristics and developmental changes in this phase are as follows:

- Children start to think symbolically and understand how to use words and pictures to represent objects.
- Children in this phase tend to be egocentric; for this reason, they might struggle to see things from someone else’s perspective.
- Even though they are getting better with language and thinking skills, they still tend to think in a very practical and tangible manner, with little room for abstract thinking.

**Concrete Operational Stage**

Elementary-age and preadolescent children, ages 7 to 11, exhibit logical, coherent, concrete thinking.

Kids’ reasoning at this age becomes less egocentric and they are progressively more aware of external events. They begin to realize that one’s own thoughts and feelings are unique and may not be shared by others or may not even be part of reality.

During this stage, however, most children still can’t think abstractly or hypothetically. The egocentric view of the previous stage begins to fade out as children start to have a much better understanding of others’ point of view and feelings.

Major characteristics and developmental changes in this phase are as follows:

- In this stage, kids begin to think logically about real events.
- They start to understand the concept of conservation, for example, that an amount of liquid is still the same even if you move it from a thin and tall container to a large and short one.
- Their thinking, despite still very concrete, becomes more logical and organized.
- They begin using inductive logic or reasoning from a specific piece of information to a more general principle.
In both stages though, some key cognitive skills are still immature: the theory of mind, which is the understanding the intentions and emotions of others, empathy is still under construction; cognitive flexibility, meaning the capability of processing conflicting information and switching perspectives; and executive function, the ability to plan and monitor their own behaviors.

Some Design Recommendations

The following are some UX recommendations to keep in mind when designing any kind of digital product for children.

Have a Clear Goal for the Activity

The goal of the activity should be clear, and it should be clear how to achieve it. To do this, you can use different techniques. You can, for example, use an animation to show how to play the game or execute the activity or a simple tutorial with step-by-step instructions.

In this case, don’t forget to provide feedback after every attempt at each step. Feedback is important on any digital product, also for adults, but for kids is mandatory. Providing feedback is not enough though, the feedback must be appropriate for the level of understanding of your users. Earlier we talked about cognitive development and we saw how young kids can’t fully grasp others’ point of view and feelings. So if your feedback is just based on a character doing different expressions (happy, sad…) according to what action the kid performs, it might not be enough for a 3–4-year-old to understand if the kid is doing something correctly. There could also be a cultural component to consider in feedback based on a character’s face expressions and gestures; sometimes they mean different things in different cultures. Consider adding voices with a clear message like “That’s right!”, “Why don’t you try again?”, and so on.

Instructions Should Be Designed to the Child’s Level of Understanding

This second recommendation is strictly related to the first one. When you explain the activity, be aware of the language you use; it must be easily understood by your users, according to their age capabilities (basically what we previously discussed about cognitive development comes into play here).
Help Kids to Complete Tasks by Using Existing Mental Models and Their Knowledge of the World

As we said before, children can’t immediately think symbolically, and even in the older range, we’re considering they are still developing this skill. It’s crucial, then, to leverage their existing mental models to explain things and guide them through the activity.

A digital art app for adults might use colored circles or squares to indicate the color swatches in a palette (Figure 7-1). For a kid having something resembling a crayon might be better (Figure 7-2). Even though, in truth, my direct experience with my 2-year-old daughter is that after she saw me selecting colors in Procreate, she was immediately able to switch them by herself, calling the palette and then tapping on the color she wanted. But she saw me doing that first, this is the big difference, one thing is learning by observation, another is discovering by exploration.

Figure 7-1. Procreate palette panel
In general, using mental models from a real-life situation they know well can help guide children in completing the tasks. This could let you consider the idea of using skeuomorphic design, and we’ll see more about this topic later in Chapter 8, when we’ll talk about user interfaces.

Design Self-explanatory Interfaces to Reduce Cognitive Load and Prevent Errors

In the field of UX, by “cognitive load” we mean the amount of mental resources needed to perform a task.

Even though our memory is pretty much infinite, unlike the one of our devices, our brain power is not. When we have to deal with an amount of information that exceeds our biological CPU’s capabilities, our performances suffer and we take longer to understand information, we miss details, we forget things, and, in the end, we might feel so overwhelmed that we decide to drop the task altogether. As designers, this is obviously something we want to avoid.

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2 Simulating real-life appearance. See Chapter 8 for more on this topic.
3 Whitenton, Kathryn. “Minimize Cognitive Load to Maximize Usability.” Nielsen Norman Group. N.p., 22 Dec. 2013. Web. 01 June 2020. <https://www.nngroup.com/articles/minimize-cognitive-load/>.
The interfaces we design should help users to off-load their working memory. Whenever we're engaged into a task, we constantly load our memory with information, and if the interface is not designed properly, we might forget things when moving from one step to the following. This is not because we're distracted or forgetful. We've simply overloaded our working memory with too many information. A well-designed user information should guide us through the task and serve as an aid to our memory, so that we don't need to store all the information.

A common UX myth is the famous “7±2 rule” also known as Miller's law. George Miller was an American psychologist, one of the founders of cognitive psychology. In 1956 he observed how the average person can store in its short-term memory from five to nine items. In UX design this observation is often taken too literally, with designers avoiding designing menus with more than nine choices. The misunderstanding here is that Miller was talking about information that we have to memorize, but menus should be available at all times when using an interface, you don’t need to remember all the options by heart. Can you imagine memorizing all the menus and submenus in Adobe Photoshop? Or reducing all its menus to no more than nine items? In both cases, an impossible thing to achieve.

So reducing the load on the working memory means designing experiences that support the user in performing the tasks and achieving their goals, without overloading the cognitive capacity, so that they don’t abandon the task and the whole product.

Designing self-explanatory and intuitive interfaces is a best practice for adults’ products, but is especially important for those of kids because they are less knowledgeable about user interfaces and digital products in general. The average adult has years of practice using digital products on different devices, so we can now consider some interaction patterns as common knowledge. For example, the scrollbar of a document or web page is now obvious to anyone, but a young child might not understand a scrolling interaction using a similar component. In fact, a lot of components we commonly use in user interfaces don’t have anything in common with real-life situations; they are not based on any mental model familiar to kids. So what we consider easy and intuitive as grown-ups will require careful testing to be regarded as the same also for children.

Interactions: Consider Age and Device Peculiarities

In Chapter 4 we talked about children’s physical development and how this affects the ability to perform certain interactions or use certain devices.

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4 Mcleod, Saul. “Short Term Memory.” Short Term Memory | Simply Psychology. N.p., 2009. Web. 01 June 2020. <https://www.simplypsychology.org/short-term-memory.html>.
When we design a digital product for kids, we should have clearly in mind which device is more suitable, not just for the kind of product but for the age group we’re designing for.

**Use Touchscreens for Younger Kids**

Touching an interface is the most natural way of interacting with a device. When we use a keyboard, a mouse, a trackpad, a joypad, or any other input peripheral that lives separately from where the output is displayed, we have a mediated interaction; we act on one device and we get the result on another. When we use a touchscreen instead, the input and output live in the same space. I tap on a button and I can see it reacting under my finger (remember: feedback!); I don’t rely on a cursor moved by a thing resting on my desk to click on a button displayed on a screen a few inches away from where I move my finger.

It’s easy to understand how touch interactions are friendlier for children and how they require less cognitive load. The interface mimicking the physics of real world makes the interaction simple and clear to understand. They are not just simple to perform; they are also intuitive to discover and easy to remember.

In products designed for children, we should limit touch interactions to the most natural and simple ones: tap, swipe, drag.

In my experience, dragging is already a little too advanced for very young kids. In the first version of an educational game I designed, kids moved the character by dragging it around the screen. During tests we noticed how this dragging action required too much finesse in the arm’s movement for younger children, so we let the character move automatically where the kid tapped. Older children could still drag it around to enjoy a smoother experience and get a better sense of control over the character, but younger users could easily move it around and enjoy the product as well. It’s a good idea to provide, when possible, more than one option to perform actions. Each kid will decide how they want to interact with the product, in the way they find more comfortable.

In products designed for adults, we have witnessed the genesis of a crazy amount of new touch interactions in the past few years. Starting with multi-touch gestures we got to the point where users are supposed to master five-finger pinches, four-finger swipes, up to crazy things like squeezing the phone or using knuckles to knock or draw circles on the screen (these are real examples).

These newer gestures can’t be considered “natural” as they are not the digital translation of a real-life action; the reason for their creation is just that we ran out of natural gestures and we needed to come up with new ones to add more functionalities and shortcuts avoiding conflicts (a gesture being
associated to more than one result). But these *artificial* (as opposite of *natural*) gestures are more difficult to remember and to master. The lack of a real-life counterpart makes them harder to discover and less memorable; users need to memorize them and remember what we associate to each one of them. Swiping up with three fingers to call the multitasking screen, there’s nothing we do in real life that resembles this gesture and its result; therefore, it’s something we have to learn and remember how to use when we need it.

The price for these added functionalities is a more complex user experience and more cognitive load for the users.

We can’t ask young children to learn and perform gestures outside the ones we classify as natural. And even among them we have to carefully evaluate if they can perform them considering the physical development of the younger users (remember the difference between fine and gross motor skills; see Chapter 4 for more information).

### Unintentional Touches

Young children can tap on a touchscreen in a very natural way, but they are not aware of a simple limitation of this technology: if you touch more than one area, the device doesn’t know which touch was intentional and which was not. I’ve observed this happening a lot with my 2-year-old daughter. When holding the screen, they often touch along the edge, so the device registers that as a tap, and, as a consequence, the intentional tapping does not respond, causing frustration and confusion.

We can solve this problem in different ways, each one with pros and cons:

- By implementing a palm-rejection algorithm. Similar to what many digital art apps have, to let users rest the side of their hand on the screen while drawing. This assuming the accidental touch is not with just one finger.
- By defining a safe area around the edges where the app doesn’t detect any touch. And this, of course, works only if such unintentional touches are within the safe area.
- By using some sort of timed touch detection. The app rejects touches when held for too long. Also this solution makes sense for unintentional touches caused by how the kid holds the device, not for accidental taps.

I don’t consider this a major problem, but when designing touch-based interfaces for kids that are very young, it’s something I would consider and eventually test.
Desktop-Based Designs

As we saw in the previous section and in Chapter 4, touchscreens are the best option for younger children. But from the age of 6, we can start considering also computer-based products involving a mouse and a keyboard. In this case though, the interactions that we can use are limited to simple key pressing and clicks on big targets. The size of the target is very important, both with touch interfaces and with mouse-based interfaces, but we'll talk more about this in Chapter 8, which is dedicated to user interface design best practices.

Dragging and scrolling using a mouse or a trackpad requires a level of motor skills that is often too advanced for this age group. The best practice is relying solely on simple keyboard interactions (pressing one key at a time, no combinations of keys) or simple clicks. As mentioned in the previous section, we can still provide dragging interactions, as long as we give the alternative mode based simply on clicking to select the element we want to move and then clicking its destination. Another technique is the *click-n-carry*: the user clicks on the object to drag, this automatically attaches to the cursor, without the need of keeping the mouse button clicked, and then the user can release the object at the destination with another click. Click to attach, move, click to release, instead of click and hold, move, release.

Around age 9, however, kids have developed enough fine motor skills to perform any kind of interaction. Many kids at this age already use gaming consoles and are able to interact with any common device.

Table 7-2 shows a comparison between different age groups and the corresponding suggested interactions and devices.

| Age            | Interactions                                                                 | Devices                                      |
|----------------|------------------------------------------------------------------------------|----------------------------------------------|
| 2 years old    | Single tapping                                                               | Tablet                                       |
| 3 to 5 years old | Tapping, swiping, dragging                                                   | Tablet (smartphone too, for 5-year-old)      |
| 6 to 8 years old | All touch-based gestures, Clicking with trackpad, simple keyboard use       | Touchscreens and computers with mouse or trackpad |
| 9 to 12 years old | All touch-based gestures, Dragging and scrolling with mouse and trackpad, complex coordination between keyboard and mouse | Touchscreens and computers with mouse or trackpad |
The use of touchscreens is a good choice for any age, but choosing a touch-based device as our platform is not enough; we have to consider what kind of gestures are suitable for our target age.

Simple natural interactions are the best choice for any age; these include tap, swipe, and, to a certain extent, drag, but this last one should be used carefully and an alternative mode of interaction should always be provided.

We can consider computer-based apps involving the use of a keyboard and a mouse or trackpad on products for kids that are 6 and older. Up to 8 years old though, the only interactions we should consider are key pressing and simple clicks. Dragging, especially on long distances, like from one side of the screen to the other, can be difficult to perform and easily become frustrating. Tests conducted by NNG highlighted how the use of a mouse is preferred by most children, while the same interactions performed on a trackpad are often more difficult for them to perform.

Young Kids Can’t Read Yet. How to Solve It?

Ideally younger kids should never be left alone using a device; a parent, a teacher, or a caregiver should be present at all times (see the section about screen time later in this chapter). This seems to solve the problem with the inability of preschool children to read, but it doesn’t. Yes, for sure the caring adult can intervene whenever a text requires to be read, but you want the kid to feel in control of the experience and having mysterious symbols requiring someone else for interpretation is not a way to make the child feeling empowered.

Let’s see some techniques we can rely on to try solving, or at least easing, this problem.

Use Voice

One way to give young pre-readers a way to navigate interfaces is to use voice user interface instead of relying on text. Voice user interfaces (VUIs) can be used for telling instructions to the kids, but also as an input from the kid to control the product, for example, to make a search, like YouTube Kids does.

On YouTube Kids (Figure 7-3), searches can be either by typing or by voice (tap on the microphone icon first, then talk).
Once the query is input, the results will show as big thumbnails in a horizontal scroll. Titles are small and secondary; the visual previews of the videos are the main calls-to-action.

Nowadays, voice recognition software is very good and, thanks to machine learning, it’s getting better by the day. It’s true though that when we deal with toddlers, 2–3 years old, it’s often the case they don’t speak properly, they mispronounce words or sometimes have a Yoda-like syntax, some of them don’t speak at all yet or speak just gibberish. In 2019 during its annual I/O conference, Google presented a voice recognition technology aimed to help people with speech impairments to use voice user interfaces (VUIs). They showed a technology capable of understanding nonstandard speech that was really encouraging and frankly close to magic, but something like that can be implemented only by a huge tech company like Google, with access to a never-ending source of data to feed to their machine learning algorithms and continuously perfect the capabilities of the speech recognition software. If they’ll release this technology to third parties, smaller companies and startups will be able to introduce more advanced VUI into their products and also products for kids will benefit from this. This is indeed an example of how
designing experiences for children has a lot in common with designing accessible products for people with disabilities, so learning to design for very young users will make you a better, more inclusive and more conscious designer also when working on products for adults.

When it comes to using voice as a guide to the experience, there are two main ways of implementing it in your product: using a voice actor or using text-to-speech software.

The first option clearly requires a bigger investment and it’s not a flexible solution, because in case you need to change the copy you most likely need to re-record the voice (unless you’re lucky enough to have a chance of editing it in postproduction with some cut and paste magic).

On the other hand, a voice actor will ensure a definitely more human feeling to the experience, they will be able to communicate emotions, something a text-to-speech software will not be able to provide (at least at current times), even though this software, much like the speech recognition ones, is getting better and better.

The decision depends on different factors; it’s not just about the available budget. For an educational product I was working on, we had activities generated by algorithm so that we could have an almost endless amount of variation; also the assets used were randomly picked every time from a big database of illustrations our artists designed. Given the random nature of how these exercises were generated, we couldn’t rely on an actor dubbing hundreds of thousands (probably more) of possibilities; we had to use a software-generated voice.

The decision also depends on the kind of content we’re working with. For instructional texts the software option is good enough, but for storytelling, like picture books and such, a voice actor is, of course, the best option.

Use Telling Icons

Earlier in this chapter, we learned how kids’ cognitive development is a gradual process and the ability to think abstractly and figuratively is something that happens later in a kid’s development (around age 12 and older).

Icons should resort to mental models kids are familiar with. In the software we use every day at work, the classic icon to save a file is often (luckily we started to move away from it) a 3.5 inches floppy disk, something that already in 2007 only 2% of computers still supported. But it’s a metaphor that most adults understand. Another example is the classic shape of a phone receiver, even though phones moved away from that design for quite some time now.
With kids we have to carefully think if an icon is using a metaphor that a kid won’t be able to understand. For example, we can’t use a vinyl record to represent music, as they wouldn’t know what that black circle is and what it’s been used for.

Use Animation to Guide Through the Experience

Movement gets our attention and can guide us through the experience much more efficiently than static elements. Having an arrow pointing at something could help, but seeing the interaction playing in a “demo” mode is a much more clear.

In *Toddler Games* by Bimi Boo (Figure 7-4), a dragging interaction (which I discourage to use for this age group) is explained with a hand showing how it works at the beginning of the activity.

![Figure 7-4. In the app Toddler Games by Bimi Boo, a hand cursor demonstrates the dragging interaction](image)

In this particular case, I think it would have been clearer if we could see the shape moving along with the hand and being placed in its spot.
Animation can be used to show how an interaction works or how to perform a task or play a game, but it can also be used simply to get user’s attention on one element at a time and guide them through step by step. The point is using animation can help us to get the attention of the user and distinguish what is an instructional component from the rest. If I use the same element, for example, the hand in Figure 7.4, to point at things on screen and moving it smoothly from one to the other, I naturally guide the user’s gaze where I need it to go.

Progressive Disclosure

In user experience design, we talk about progressive disclosure when we create an experience that doesn’t overload a user with all the information at once, but start with a simple setup and progressively add more information or options or tasks as the user advances in becoming more experienced with the product.

For example, in the example of Toddler Games we’ve seen earlier, the kid is prompted immediately with 3 shapes to drag and 11 empty spots. To make the experience easier to learn without any written instruction, they could have started with one shape and one empty spot, then one shape and two or three empty spots, then two shapes, and so on.

Having a very limited amount of options in the beginning limits the possibility of making errors (and being frustrated by this). With only one possible way of doing something, it becomes much easier to understand the logic and how to progress.

This technique (as well as the others described earlier) is often used in puzzle games, like Candy Crush and similar ones, where the progression is very mild, the learning curve is very gentle, and users feel in control, get a sense of reward by completing levels, and are encouraged to progress.

These games are very good at not frustrating their users, and they do it because they monetize over people getting addicted to them. We don’t want our users to get addicted to our product, but we surely share with those games the interest in making the experiences as enjoyable as possible and making our users feel in control.

Kid-Friendly Navigation

As adults, our average tech savviness nowadays is quite high. Most people using a digital product that follows the common UX patterns and best practices understand how to navigate through its sections, make a search, login and logout, and so on, without the need of any instruction. We’ve been trained for decades now; we experienced the evolution of digital products
and witnessed the development of user experience design as a discipline. Almost anyone of us, put in front of an average product for the first time, will quickly grasp how it functions and how to complete the most common tasks.

Children still lack this knowledge as they are still new, or quite so, to digital products. Put in front of an interface where affordances are not clearly identifiable, they struggle to understand what is interactive and what is not.

Of course all of these concerns and best practices are more true and valid for younger children, while the older our users are the more they start to have adult-like capabilities. A 12-year-old is able to understand how a drop-down menu works, while a 3-year-old can’t.

Affordances

Let’s start by defining what we mean by affordance. This term has been introduced in user experience design by Don Norman, a researcher, professor, and author in cognitive science and usability engineering, largely credited as the founder of user experience design as a discipline.

In Don Norman’s 1988 book, The Design of Everyday Things, affordances became defined as perceivable action possibilities. A component’s affordances depend on users’ physical capabilities and past experiences.

An object (or UI component) that doesn’t communicate how it can be operated is lacking affordances.

Take a look at this example (Figure 7-5); the list on the left doesn’t provide any affordance to suggest it is a scrollable list and more items are present. The viewport contains exactly eight items and each item is tall one-eighth of the viewport’s total height; there is no hint for users to understand they can find more if they scroll up or down.

In the image on the right, items are spaced differently, users can still see there are eight items there, but the last one at the bottom is cut. Moreover, the light gradient on top of the item in the final portion of the list is a visual aid to “trick” users’ brain into thinking the list goes on beyond what they can see at the moment. Lastly, the fact that the bottom item is cut and the gradient is at the bottom of the screen suggests the users they can scroll from the bottom up, while if these affordances were at the top of the list, they would have suggested the opposite interaction.

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5IDF “What Are Affordances?” The Interaction Design Foundation. N.p., n.d. Web. 01 June 2020. <https://www.interaction-design.org/literature/topics/affordances>.
For children, given their relative inexperience with interacting with digital products, affordances are even more important and need to be even more clear.

There are different ways in which you can make affordances clear for children:

**Use of color:** Consider using bright colors on interactive elements and more muted colors for backgrounds and noninteractive elements in general (see Chapter 8).

**Use of animation:** When kids see an animated element, they expect it to be interactive. They are naturally drawn to try tapping on it to see what happens. Static elements are less so, but be aware that animating everything can easily bring too much visual noise and confusion. Use with care.
Adding a shadow to a button is a typical way of suggesting affordance in UI. But for younger children, everything on screen is flat, regardless of any shadow it projects. This metaphor might not provide a good affordance for them.

Moreover, for affordances on kids’ products, size matters. We already talked about motor skills and performing interactions; we’ll discuss more about sizing and other visual design topics in Chapter 8 on user interface design.

**Information Architecture**

Simplicity is key when it comes to organizing information in children’s product. While adults’ apps and websites, depending on their complexity, can have a hyperbranched information architecture (IA), in products for children you want to keep it as flat as possible.

If you have a lot of information and section to arrange, having a flat IA means having too many items in a menu at the same time. It’s a trade-off, fewer items in the menu mean a more branched IA, fewer branches in the IA mean more items in the menu, generally speaking.

A hyperbranched architecture can become confusing even for adults; that’s why big websites, with lots of information, like a public administration portal, for example, can be very tricky to navigate and require tools like *breadcrumbs*\(^6\) so that users don’t get lost. The ideal information architecture for a children’s product is made of 2, max 3, levels (Figure 7-6).

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\(^6\)Breadcrumbs are a tool used in web design to help users understand where they are inside the branches of the information architecture of a website. It’s a series of links that starts from the root (the homepage) and follows the path the user took to get to the page they are viewing. It usually looks like something like this: home > category 1 > sub-category 3 > detail page 2 and it’s normally located high in the page layout.
In the IA shown in Figure 7-6, we can see how we have a first level menu with Games and Stories; each of these has a second level, for example, the Games category includes Driving, Puzzles, and Sports, and the Stories category includes Fantasy, Space, and Adventure as second level. The third level is the final one before starting the game or the story. You don’t want to go deeper than this, and for children 2–5 years of age, it’s best to keep it 2 levels deep or less.

For children inexperienced with the digital environment, it’s harder to make a mental mapping of the product, and they can get frustrated if they get lost and don’t find what they are looking for. Keep things simple, find the right balance between having too many choices in one screen and going too deep into nesting information.
Menus

Menus can take so many different forms, but not all of these are suitable for children. For example, a drop-down menu requires both motor and cognitive skills beyond young kids’ capabilities. As I mentioned in the previous section on information architecture, it’s best to try keeping your menus slim, with as few options as possible, such options need to have clear affordances and be clearly separated from the background.

Top navigations and bottom navigations can work for older kids, but for younger users menus should have a central role on the home screen. These options can’t be text only; as we discussed in this chapter, younger kids can’t read yet, but also older kids might not feel so confident with written words, plus images are way more attractive for any kid. Menu options then are best served with icons or small illustrations that clearly explain what that option is about. When we talked about cognitive development, we said how hard it is for children to think abstractly and metaphorically, so literal representations of things are the best way to go.

On the Emmy-winning StoryBots iPad app (Figure 7-7), I worked on as product designer, we went through several iterations of the home screen, before landing on the final one where the menu had a very prominent role, choices were limited, IA was flat, and icons were quite expressive and animated.

Figure 7-7. Home screen of the StoryBots app on iPad
From my observation though, I can tell you that children have a very good visual memory, so even if they don’t understand what an option is, and the parent, teacher, or caregiver shows them how it works, they’ll memorize and remember also more abstract representations. Of course, this is not ideal; you want your product to be intuitive and clear for kids to be used on their own (not alone, on their own with an adult’s supervision is always the best situation).

**Feedback**

Children want feedback; they need the product to respond to their interactions. First of all, giving feedback is always a good idea, for children and adults. But children have less experience in dealing with devices and digital interfaces, so for them it’s even more important to know that whatever they are doing it’s having some kind of effect.

This feedback can go from a simple change in the appearance of a component to more articulated animations, including also a sound effect.

**Microinteractions**

We started this section’s conversation talking about feedback, but feedback is just a step of a bigger process called *microinteraction*. What is a microinteraction and why is it important in this context?

If you look online, you’ll find a few different definitions of what a microinteraction is. This is mine:

> A microinteraction is the minimum expression an exchange between the user and the system can take.

A single moment of an interaction can be identified as a microinteraction. A microinteraction is never made of a sequence of multiple gestures, as illustrated in Figure 7-8.
A microinteraction can be triggered by the user (e.g., a tap or click on a button) or by the system (e.g., a push notification); this trigger is interpreted according to rules defined in the system and causes a feedback in response; such feedback can be looped or not, depending on the microinteraction, the context, and so on. See Figure 7-9.

The topic of microinteractions is quite big and here I just want to focus on why they're important in products for children. Microinteractions can help in

- Providing a sense of physicalness to the interface, by bringing metaphors of the real world into the digital space, for example, the reaction of a button when it’s pressed (see next section). This helps the transition from real to digital.
• Reassuring the user that what she/he’s doing is having an effect on the product.
• Adding some fun to the experience. Remember that children are in for the journey, not really for the destination. When using a digital product, they are experience driven, not task driven as we adults are.

**Visual Feedback**

Let’s see a classic example of feedback provided with a visual design approach: a pressed button.

Buttons are the most common component at our disposal for children’s interfaces. For this reason, it’s important that these buttons provide the correct experience. A button should always have a pressed state (Figure 7-10) to communicate that it’s reacting to the child’s action. The way you want to communicate this can be different depending on the style of your UI, you want to make the button slightly smaller, as if it was being pushed back, away from the user, or you can tune down the brightness, or make its shadow (if any) disappear, and so on. The important thing is providing a noticeable difference in its appearance in order to make it clear that yes, the app is reacting to my action.

![Figure 7-10. Change of appearance in a button to communicate a change of state when pressed](image)

The visual feedback you associate to this event could be anything, but it’s always a good idea to mimic realistic reactions so that components act in a natural way. A button that expands or rotates when pressed would look quite odd, because that’s not the behavior of a physical button.
Animated Feedback

Animation has become more and more important in modern interfaces. We saw in the previous section how different states of a component can provide visual feedback that something is going on. To transition between two states, we can use an animation. An animation enhances the feedback, smoothing the jump between states and inducing a stronger emotional response into the user.

An animated feedback can communicate a message and can make the experience more entertaining. When designing for kids, you can even go a little further compared to when you’re designing for adults. While we all appreciate smooth and eye-candy animations in apps, children might find them fun enough to make them sort of a fidgeting device, like a springy reaction of a button or a drawer that overshoots when enters the screen (Figure 7-11), for example. These kinds of cartoony effects work great in interfaces for children.

![Spring and overshoot animation graphs](image)

Figure 7-11. Spring and overshoot animation graphs

Animations can really speak to the user. The movement you use should mime the message you want to give. One classic example is a component that shakes left and right to communicate that something wrong happened (e.g., you pressed the wrong button). This movement reminds of someone shaking the head to say “no” (it might not be true for all cultures, so this depends on where the product will be released, who is your target).
Animated feedback can even go further than this. In some cases, you really want to communicate an accomplishment, not just the reaction of a component to an interaction. A correct answer or the unlocking of an achievement (see Chapter 5 on gamification) might deserve some fireworks, figuratively speaking—or literally.

**Auditory Feedback**

Another very important way of giving feedback is by using sounds. Earlier in this chapter, we analyzed various solutions to help nonreading children, and one of these was the use of voice-overs. That is one perfect example of a sound we can use when kids need a more articulated feedback. But sounds should be also associated to smaller events (i.e., microinteractions), like the press of a button or a swipe or the grab and release of a drag-and-drop interaction.

For these sorts of events, the use of funny and quirky sounds works great along with the kind of animation effects described earlier. Keep it fun, take inspiration from cartoons.

The choice of the sound is very important to complement an animation: it has to match the action, or it will look wrong. A button that pops in and makes a “swoosh” sound would probably look strange, but that same sound on a swipe will fit. The sound should serve as a narration of the animation.

Sounds can be effects or music. In both cases, it’s important to make them fun and cheerful, so in the case of sound effects, don’t be too realistic and, in the case of music, keep it upbeat. You can use a “sadder” tone when you want to provide a negative feedback for a wrong answer or interaction.

**Haptic Feedback**

This technology became popular a while ago, and now, on modern devices, haptic feedback reaches incredible levels of realism. Recently, I was talking about this with a friend who did not know nor believe that the trackpad on my MacBook Pro wasn’t actually physically moving, but the feedback was just haptic. To convince him I had to turn off the computer and let him feel the trackpad was not clicking at all.

The same goes with the “pop” we feel when using Force Touch on an app on the iPhone. In this case, the animation on the contextual menu that appears helps to deliver the illusion of something actually popping under our fingertip. This example is perfect to understand how the combination of animation and haptic feedback can trick our brain into thinking something physical is happening, while in reality, it’s the response of a digital object. If, to all of this, you also add the right sound effect, then you hit the feedback jackpot.

Children need feedback, not just for entertainment but also to understand the product is responsive to their interacting with it.
Visual, motion, sound, and tactile responses combined can be a very powerful cocktail to make your product speak to the user without actually using a voice. They can enhance the user experience greatly, not just by making it more intuitive but also more enjoyable and fun to use. That said, you don’t need to combine all of them every time. Sometimes you can use just visual and animated feedback, sometimes you can add a sound, and so on. Crafting the right feedback for an event is a task you shouldn’t overlook, because it can really make a difference in a product.

Help Kids Focus

Having kids’ attention is not a matter of wanting them to become addicted to our product; this will never be our purpose. We want their attention to teach them how to focus, to help them avoid distractions and learn how to concentrate on a task. The user experience design of our app plays a big role in this.

In our daily life, we are more and more distracted by the many devices around us, demanding our uttermost attention with an endless stream of notifications and stimuli. So much so that big tech companies, like Apple and Google, and all the major smartphone OEMs are moving steps into what we call “digital well-being.” Both Android and iOS now offer tools to monitor our apps usage, how many times per hour we pick up our phone, how much time we spend on socials, and so on.

During our work we’re also constantly jumping from app to app, from device to device. We answer a message on Slack, we jump into reading an email, we go back to a PDF we just downloaded, we read the notification about an upcoming meeting, and so on. We lost our ability to focus.

The difference is that when we were kids we didn’t have such distractions, but kids nowadays potentially do, and this could really hurt their ability to focus. This is why screen time is a very important topic and why we need to help them focus when they are using our product.

But why do kids get distracted in the first place? As I said several times, they are just different from adults and they reason differently. As grown-ups we learned to deal with boring tasks, we know that if something has to be done, it doesn’t matter how unpleasant, we have to deal with it. Kids still have to learn that, or they are on their course to do so. If they are presented with a boring activity, they easily diverge toward something more appealing to their natural curiosity. This curiosity is one of the main reasons for their distraction, but it’s absolutely a good thing. Being curious is the main driver to knowledge; we don’t want to impede that of course, but we want to help them learn how to focus, how to deal with boredom if necessary, and, generally, how to become reliable and dependable.
Avoid Notifications and Pop-ups

In-app notifications on children’s product should be avoided, as well as pop-ups that appear from nothing, to promote more games or other distractions.

We have to carefully craft the experience so that users are guided where they want to go without being interrupted by unwanted messages. We pave the road for them to get to their destination and we don’t want to put any billboard along the way. Notifications and pop-ups are most of the time annoying for adults; for kids they are not just annoying but confusing and distracting.

Let me clarify one thing though. What’s the difference between an in-app notification and a push notification?

Push notifications are the ones appearing outside of the app sending them. They appear on a system level also when your screen is locked. They’re the classic notifications you get when receiving a message or things like that. A developer can decide to send a push notification as a marketing tool to notify users about special promotions or new product releases, and we’ll talk about this later when discussing about marketing and other money-related stuff.

An in-app notification is a notification that appears within the app, usually as soon as you launch it. It can be used for different purposes, for example, communicating an update or again to promote related products from the same developer.

Why is this difference important to us? A push notification appears on the device, regardless of the app you are using or even regardless if you’re using the device at all; therefore, it’s more likely to be something an adult is going to read. More than part of the app experience is part of the device or OS experience.

An in-app notification is an integral part of the app user experience. It’s something happening and living within the app, so it’s an integral part of the kid’s experience when using your product. In most cases, it’s also customized using the app design language, rather than the OS’ design system.

So, while the push notification speaks to the parents through their devices, the in-app notification speaks more directly to the kids.

Use Animations and Easter Eggs Wisely

We talked about how animation can help guide the user and make the experience more engaging. Animation should not be distracting though, using animation too much, in too many places and without a real purpose, especially during a task (and by task I mean also a game, not necessarily something strictly educational) can drive the user’s attention away from where it should
be in order to complete it. Same goes with Easter eggs, we all love a bit of surprise in our experiences with digital products. Something like confetti appearing when you write “Happy birthday” to someone in a messaging app, it’s a fun, surprising moment that can make the experience delightful and create a more empathic bond with the product. But they should be the exception, not the rule; used sparingly they amaze and entertain, but used too much becomes annoying and, most of all, distracting. Also kids tend to try playing these things over and over, once discovered they become the focus of the experience and that’s not what we want.

So, yes please, add some magic moment to your product, but don’t overdo.

One Thing at a Time

Multitasking is not for kids. Our pride in the ability to do many things at once should not trick us into trying to teach this skill to kids (and honestly, it’s making no good to adults too). To teach kids how to focus is best to prompt them with one task at a time. You can anticipate what’s coming next, but you don’t want your user to be able to jump frantically from one activity to another.

Break Bigger Tasks into Smaller Chunks

Breaking up a big task into smaller activities is an effective way to help children (and adults for that matter) concentrate and complete it. It’s the same principle adopted by ABCmouse in their learning path, which is very long, but organized in lessons, and each one has a series of small activities. They have an overview of the goal and the path to get there, but they’ll tackle one thing at a time in smaller tasks.

Another good example is the shopping and cooking activity on Papumba.

First, the kid is asked by the grandpa to buy groceries to prepare a dish (Figure 7-12).
Then, at the grocery store, the task is putting on a scale one ingredient at a time (also notice the hand indicating what is the focus of the task; no text involved besides numbers) (Figure 7-13).

Figure 7-12. Step 1, grandpa gives the kid a recipe
When putting ingredients on the scale, kids get immediate feedback from the voice-over, visual effects, and the store clerk character’s reaction (Figure 7-14).
Once the task is complete, they can see it’s marked as done (Figure 7-15).
After buying groceries, they can enjoy feeding grandpa with the dish they helped prepare (Figure 7-16).
Furthermore, activities like cooking by following a recipe can be defined as **sequencing**. Sequencing means following a series of instructions in a particular order, and it’s a kind of exercise that helps improve concentration and focus.

**Rewards**

Another way to improve concentration is by providing rewards. Rewards are one of the main techniques used in a gamification strategy, as we discussed in Chapter 5.

The idea of a gratification at the end of a task is very powerful, and this works especially well in the form of **blind box gift** and collectibles. This strategy is commonly used in casual arcade games, where players unlock more playable characters the more they play; a very famous example of this idea is the very popular mobile arcade game *Crossy Road* that, as of mid-2020, includes 272 different characters.

The idea of collectible is very often developed in the form of a stickers album. Kids can gain more stickers by completing activities; *Lingokids* (Figures 7-17 and 7-18), an app to learn English, uses this idea.

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**Figure 7-16.** Step 5, grandpa, kid, and the cat (yes, the cat too) enjoy the recipe
Figure 7-17. Sticker unlocked in Lingokids

Figure 7-18. Stickers album in Lingokids
Set Breaks

Alternating moments of pure fun to moments of learning can help kids be more concentrated during the latter. If your product offers a learning path with several lessons one after the other, consider having something fun to watch or to do every few learning activities. It could be a fun music video or game, something purely enjoyable just to relax and have a laugh. Knowing something like this is ahead can be also a good motivation to progress further in the curricula.

It could also be a good idea to suggest activities away from the screen or combine the two in a smart way. You could, for example, invite the kid to draw something on paper then snap a photo of the drawing and paint it digitally, add stickers, and so on, or you can take advantage of more advanced technologies such as augmented reality (more on this in Chapter 11).

To summarize the ways to help kids focus:

- Avoid distracting events such as notifications and pop-ups.
- Use animations and Easter eggs wisely. Don’t overdo.
- Ask the kids to do one thing at a time. Don’t overwhelm them.
- Break big tasks into smaller activities.
- Offer rewards.
- Set moments of distraction and recess.

Screen Time, Ethical Approach to Design

*The next evolutionary step is into the screen.*

—Marc Maron, comedian

When talking about kids’ well-being, few topics are more controversial than screen time. It’s one of those topics on which every other day a new study comes out stating the opposite of the previous study; it’s one of those “Coffee is good for you, no wait, coffee is bad… I mean good, or bad, it depends. But good. No” topics.

Sure, you won’t find any study stating that the more screen time, the better, one thing is evident: screen time has to be monitored and accompanied by a parent or caregiver whenever possible. The point is: how much is OK?
As parents, we care for our children’s well-being and we want to make informed choices on the time they can spend with a tablet in their little hands, or in front of a computer. But we also know how tempting is the soothing power of the screen to calm down a toddler having a tantrum on a crowded bus or at the pediatrician’s waiting room. It’s a powerful tool that can’t be abused.

As designers, we want to facilitate these informed choices. Nowadays, many digital products (for adults) are designed with the specific purpose of capturing our attention for as long as possible. Social networks are a primary example of these practices. The most infamous example is maybe the “endless scroll” that is now ubiquitous in many digital products out there, not just on social networks. You scroll content with no end in sight, scroll, scroll, scroll, scroll, and fresh content continues to pop up, with no care for your tired thumb. Where is the good old pagination gone?

Digital well-being is now a hot topic in design, both iOS and Android offer tools to track the usage of apps, how many notifications we receive per hour, how often we pick up our phone, and so on. All these metrics have the purpose of helping us to maintain a healthy lifestyle.

With kids, this is even more important.

A fundamental step in kids’ development is the imitation of adults, and one of the most common things today’s adults do is using mobile devices. Kids get to know these objects very early in their life; according to a study presented during the annual meeting of Pediatric Academic Societies in 2015, most kids have used smartphones and tablets by the age of 2. The study, about kids’ exposure to media and electronics, involved 370 parents of children between 6 months and 4 years old.

The survey showed that 97% of the families’ homes had TVs, 83% had tablets, 77% had smartphones, and 59% had Internet access. Parents revealed that 52% of kids under the age of 1 year had watched TV, 36% had touched or scrolled a screen, 24% had called someone, 15% used apps, and 12% played video games. The time spent in front of a screen rose proportionally with the age, with 26% of 2-year-olds and 38% of 4-year-olds using devices for at least an hour. To challenge their thinking and problem-solving skills, young children need firsthand experience with actual materials and tools. More than a matter of “time” intended as an amount of minutes, it’s a matter of what they are doing during this time. Screen time should be monitored to understand what they are doing during their sessions with a device, which products they’re using and how, more than just define a finite number of minutes. Fifteen minutes watching a YouTuber playing pranks are not better than one hour on an app to learn reading and writing.

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7 Sifferlin, Alexandra. “Many Kids Under Age 1 Use Devices.” Time. Time, 25 Apr. 2015. Web. 24 May 2020. <https://time.com/3834978/babies-use-devices/>. 
With kids, the correct approach to technology is not just a matter of screen time though. Another important aspect is with whom they spend this amount of time on devices; no substitute for direct interaction with parents or caregivers has been found. It is also true though that children below the age of 3, if provided with the right conditions, can learn words through material on screen, but such conditions imply a parent/caregiver/educator adding additional verbal and nonverbal forms of communication during the video activity. Eye gaze is particularly important in this context. Devices can reinforce what children are learning at school, but unfortunately most of the products on the market are not made for dual use kid+adult, so a challenge and an opportunity is trying to cater for this need.

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**Challenge/Opportunity**  How can we create an educational experience able to engage both the child and the adult, reinforcing their verbal and nonverbal communication?

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Björn Jeffery, cofounder of Toca Boca,\(^8\) in an article on his website,\(^9\) stresses the importance of this relationship during activities on devices. He also adds the importance of helping children to choose the right products for them (and make choices for the younger ones), but also observing how these products are used. Are they providing occasions for bonding with friends and siblings in real life? Are they creating moments of sharing and learning? Lastly, Jeffery invites parents to promote variety. Not all apps for kids have to be educational, some could be for fun and entertainment, what is important is variety and balance with other activities outside the screen.

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Screen time is more a matter of quality than quantity.

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I absolutely agree with his opinion on this. I started my series of articles about designing apps for children (the originator idea for this book) with the same argument: just like pretty much everything else in life, the key is in balance.

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**What Do Experts Advise?**

The American Academy of Pediatrics (AAP) invites parents to avoid screen time for kids younger than 18 months, with the only exception of video-chatting. This activity, in fact, allows a two-way communication between children and relatives, grandparents living far away, for example, that differs completely from passive fruition of video contents or similar activities.

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\(^8\)Toca Boca is a Swedish app development studio focused on child-friendly applications for tablets and smartphones.  
\(^9\)Jeffery, Björn. “In Defense of Screen Time.” Björn Jeffery. N.p., 08 Sept. 2019. Web. 24 May 2020. <https://www.bjornjeffery.com/2019/09/08/in-defense-of-screen-time/>.
From 2015 to 2018 while I had been living in Los Angeles, my parents were in Italy and my in-laws in Japan. My wife and I became parents of beautiful Yui in 2017, while being very far from both our families. During that time we extensively used FaceTime to let our daughter bond with grandparents on both sides of the world. When she met them in real life, it’s been amazing to see how natural their relationship was, even though most of their time together, up to that moment, had been through a screen. So, not all screen time in general should be considered bad; it’s important to evaluate what’s on the screen, its quality and balance it with all the other experiences happening outside of it.

What else does the AAP suggest? Kids above 18 months of age, as mentioned previously, should never use devices on their own, but always together with a parent or caregiver, for no more than an hour a day. Older children can have longer sessions, but everything has to be balanced by adequate amounts of other activities and sleep (8–12 hours, depending on age); for this reason, they also suggest to keep mobile devices, TVs, and computers out of their bedrooms. It’s worth noticing though that this topic is still subjected to continuous studies, and given how digital products are still fairly new in kids’ education and development, we’ll probably see new results and guidelines as we learn more about the kids–technology relationship in the next few years.

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**Challenge/Oppportunity**  Can we include into our products the right information to educate parents on the right way to make kids approach technology?

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**Industry Insight: Interview with Sean Herman**

Sean Herman is founder and CEO of Kinzoo, a messaging platform for kids and families. He’s also the author of the book *Screen Captured: Helping Families Explore the Digital World in the Age of Manipulation*, a book where he explains the difference between good screen time and being screen captured in manipulating endless feeds, where today, even kids seek forms of social validation.

Rubens: *Kinzoo* instantly sparked my curiosity because messaging apps specifically designed for children and their families are not so common. Then I discovered your book, *Screen Captured*, which talks about the dangers of social media (not just for children), the relationship between kids and technology today, screen time, and more. This immediately clicked with me, because my book touches upon many of the same topics—though more on the design side. Your coverage of the need for ethical design for kids caught my attention in particular. In your opinion, what’s the most urgent issue we should address in digital products for kids today?
Sean: To me, the most urgent issue in developing digital products for kids is that they need to be designed from the ground up around children's privacy and safety. Kids are not a market that should be expanded into. They have such unique needs, and at younger ages I always argue that privacy and safety are much more coupled than they are when we are older. The range of negative outcomes for children when privacy has been compromised is far greater than it is for adults.

I have a huge concern when existing products simply try to expand into the kids' segment. The reason for this is that adult platforms (especially social ones) are built to optimize two things: growth and engagement. When designing products for children and families, you simply have to trade off some of the growth levers in order to keep it safe, and you shouldn't use persuasive design to drive engagement. Likes, follower counts, and streaks are examples of things that are used to keep us engaged, but I believe there are unintended consequences that come as youth are increasingly relying on getting social validation in these ways.

Retrofitting platforms that were designed for massive growth and scale back to the kids’ market is really challenging in my opinion. I think that is why we’ve seen Facebook Messenger Kids have loopholes that allowed children to connect with strangers in groups, for instance. I don’t think it was intentional by any means, but is an example of the challenges.

Even worse, several platforms have simply ignored the fact that kids use them. YouTube is the most obvious example, but we know there are millions of children in North America using Instagram, Snapchat, and TikTok, among others. In my opinion, it was easier for the platforms to ignore that fact, point to their Terms of Use (which say 13+), and simply say the children aren’t supposed to be there than it was to comply with COPPA or GDPR-K. But these are also platforms that derive their value from user counts. There hasn’t traditionally been enough disincentive from regulators like the FTC to force action, so platforms could enjoy the extra users without changing their onboarding or key workflows to protect the privacy of young users. To their credit, the FTC has done a lot with YouTube to start making some of those changes which starts with acknowledging what we as parents already know—that kids are using those platforms, and in massive numbers.

R: Kinzoo is getting some really great reviews from parents. I’m sure most of them had the same worries you have and I have about digital products for children involving messaging and social activities. How did you address that? And what are you doing to gain parents’ trust?

S: First things first, I’m a parent. Kinzoo exists because I recognized a gap with connecting my (then) 7-year-old daughter safely and privately with friends and family. I was searching for a solution and could only find Facebook’s product,
which was a full stop for me. I don’t want my daughter exposed to that platform and its business model. We built Kinzoo because I think parents need a choice, and those that are more privacy-focused can have an alternative to Facebook. Two things really differentiate us. First, as mentioned, we are built from the ground up around children’s privacy and safety. We make decisions as parents first, and as a business second. Second, we have a different business model. Kinzoo collects the minimal amount of data possible and will never sell to a third party. We maintain a list of all the data points that we capture from adults and kids on Kinzoo. It is a very short list, and we force a justification of how each data point benefits the user, and not Kinzoo, in order to continue capturing it. Gender is an example. We’d love to know the split of male and female users on Kinzoo, but we couldn’t find a way that would help our users, so we made the decision not to collect it for kids.

We will only be successful if we are successful in earning the trust of parents. We make all decisions first and foremost as parents, uncles, and aunties. We will be transparent in everything we do and will always have an open dialogue with those that want to be a part of the community. I’m most excited about that.

R: Kinzoo is kidSAFE certified. In your experience, do certifications like these work toward parents? Do they know what they mean? Is that something they are looking for when deciding which app to download or service to subscribe for their children?

S: Before we even wrote a line of code for the current version of Kinzoo, we were compliant with the Children’s Online Privacy Protection Act (COPPA), which protects our youngest users when online. In other parts of the world, especially Europe, GDPR and GDPR-K offer similar protections. I think it would be great for all parents to be aware of these regulations, but I’d be willing to bet that less than 5% of parents are, and even less factor it in when considering downloading a new app for their kids.

That’s unfortunate, because they are actually very good regulations. COPPA received bipartisan support when it was introduced around the year 2000 after regulators realized that there wasn’t much in place to protect the interests of the youngest Internet users. They are very strong and practical regulations that simply require companies to get consent from parents before children can share personal information online and protect users’ ability to control their digital footprint. It was relatively simple for us to align with the regulations because they are the sort of things that I want for my own kids online. As a result, there is undoubtedly more friction added to our onboarding process and some of the key workflows like how users connect with each other. But the challenges presented in terms of removing friction are absolutely worthwhile to me because it means a safer online world for children.
I hope we see a day where parents increase their knowledge of the regulations that are in place and make decisions based on them, but I don’t think that will happen on a large scale anytime soon. We will continue to try to educate parents on the subject and to be true leaders in the space. In terms of business model, we also know that broadly speaking, privacy is something that virtually everyone says they value, but there is no evidence yet that we are going to be willing to pay for it. So, we know that we have to bring more to the table in order to monetize our product.

R: In an article[^10] I wrote in February 2019, I was proposing the removal of Likes on social networks as a way to improve the mental health of their users. By the end of the same year, Instagram decided to remove the like count from its content (I don’t take credit for that). You purposefully avoided any mechanic like that in Kinzoo. Do you get any requests from users for such features? Is the lack of these something they notice and appreciate?

S: Likes were never on the table for Kinzoo, and we haven’t really had any users asking for them. As a messenger, “Likes” are less common anyway, but the mechanism around using the dopamine cycle to increase engagement is something I’ve educated myself on in great depth. I learned so much about persuasive design that I really got to understand the broader purpose that likes, shares, and follows serve for the platform. It creates a stickiness to the platform by users, but a consequence is that these mechanisms easily become a scorecard for people to measure themselves against and to validate their social standing.

In recent years, youth anxiety and depression have risen dramatically in the United States. I completely disagree with some that are quick to blame the rise in smartphone use among youth as the underlying reason why. It is incredibly silly and irresponsible to paint with that wide of a brush. I believe there are many socioeconomic, political, financial, and social trends that are contributing to these increased levels. In regard to technology though, from my research, the one thing I worry about the most for my own children is them measuring their self-worth in terms of these vanity metrics. I think there is enough anecdotal evidence out there when listening to youth that some, not all, do place a great deal of importance on how many “Likes” their post received rather than focusing on true connection.

I actually argue in my own book that Instagram removed them not to promote better mental health but rather to answer a growing trend of youth deleting many of their posts due to insufficient “Likes.” There are many quotes from youth that speak to that fact. Further, if you review the statements made by

[^10]: Cantuni, Rubens. “What If Social Networks Had No “Likes”?” Medium. UX Collective, 11 Jan. 2020. Web. 16 July 2020. <https://uxdesign.cc/what-if-social-networks-had-no-likes-e29aedcb1f88>.
those involved with Instagram in regard to removing the feature, they speak to declines in user-generated content due to this pressure as a reason for the change. As a platform, Instagram is only going to be as good as its content, and youth removing huge amounts of their UGC is most definitely a problem for them. Maybe I’m a bit cynical, but I don’t think Facebook companies would make a change like that solely for the “greater good.” There’s always going to be an underlying business reason, which can usually be traced to how they grow and engage their audiences.

I tell the story early in my book of how a child platform that included likes and followers and, even worse, tied rewards to them (like unlocking new features at a certain threshold of followers) was a major catalyst both for my book and for a lot of the design decisions we made in Kinzoo. Any platform that anticipates having users under the age of 13 should not include the notion of Likes and Followers. Period.

R: In this book, I point out several times how designing for kids means designing for many different targets: first, we have kids of different ages, then we have parents (and families in general), and often also educators. What is your approach to design both on an interaction and a visual design standpoint?

S: We are trying to accommodate a user base with people aged from 5 to 95, which is incredibly challenging. We partnered with a world-class design company and spent almost a year designing the current version of Kinzoo. The process involved many, many rounds of research, prototyping, and usability testing to get it just right. Or as right as we felt it could be. We took a lot of time and care with each segment—kids, parents, grandparents—to better understand what we had to consider.

From a design perspective, we are dealing with young ages that don’t have a lot of learned patterns when it comes to apps, but definitely don’t want to be treated as “babies.” By that I mean they want room to explore, want to feel some level of ownership and empowerment, but definitely don’t want a UI and UX that feels “pre-K.” I think YouTube Kids is the classic example of a product that many children reject (when they get to age 5 or 6) because of these reasons.

Parents have a lot of learned patterns and are used to fairly open platforms that make it incredibly easy to connect with others. We have to continue working with parents to give them a user experience that feels familiar but that also educates them on why things have been designed in certain ways to protect the interests of their families. We’ve really had to do a great job of finding ways to reduce friction so that we can grow, but to educate parents on why we have additional things in place to protect their privacy.
The other aspect that is incredibly challenging is to build a product that is flexible enough to be able to accommodate many definitions of “family.” It is relatively easy to design for the nuclear household, but it gets exponentially challenging once we factor in divorces, stepparents and stepsiblings, and countless other permutations of family. We spent an enormous amount of time on this, and it will continue to be something we’ll have to focus on improving. We want Kinzoo to work for all families, no matter how they define it.

Kinzoo is also unique in that we are a platform shared by both adults and children, as opposed to being two separate platforms like Facebook Messenger and Messenger Kids. As a result, we have many other things we have to consider, but we are excited by the challenge.

R: The COVID-19 pandemic forced families to be apart for quite a long time, with distancing especially affecting grandparents. Did you see a spike in Kinzoo usage during this time? Do you think this event changed the perception of digital products for kids, making us realize we need more specific tools for them?

S: Kinzoo was up on the App Store, but for all intents and purposes, we were still running in private beta as COVID-19 began to have a large impact on our lives. In early to mid-March, we absolutely saw a spike at the top of our funnel (website traffic) right to the bottom (downloads and engagement).

I think COVID has many of us rethinking our relationship with technology. I think many parents began seeing screen time as not an enemy, but rather a way to keep their kids connected with friends, family (that might otherwise be very isolated), and classrooms in a very challenging environment. Further, I feel as though parents also got to witness the fact that our kids still often prefer real connection over devices. Many children have outright rejected things like Zoom and would love to get back to the classroom. So, fears about our kids only having friendships through screens should diminish some.

I think Kinzoo’s value proposition was never more clear during this period, and I think more parents will think about how to better incorporate technology in the lives of their children as a result. I am hugely optimistic that technology can be a net positive for our kids, but we have to focus on giving them the best of it, without exposure to the worst of it. For us, we focus on connection, creation, and cultivation as our product pillars, which we think is a great start.

I hope we see more new companies emerge that put the interests of their users and their privacy ahead of the interests of advertisers. I think with that, we will really being to unlock the vast potential of technology for our children.
Chapter Recap

- Children and adults look for different experiences in digital products.
- Mental models and cognitive load must be age appropriate.
- Children develop in four stages: sensorimotor, preoperational, concrete operational, and formal operational. Each one corresponds to a different level of cognitive and motor skills.
- Interactions should take into account the stage of development of our audience.
- The choice of the device depends also on the age and development of our target. For younger kids, touch-based devices are the best option. Older kids (8 years old and up) can use mouse and keyboard interactions as well.
- Preschoolers can’t read. You can help them using different techniques: use of voice-overs, animation, telling icons, and progressive disclosure. These can be combined together.
- Navigation and information architecture have to be simple. Don’t let your IA become too branched.
- Avoid distractions like notifications, pop-ups, excessive use of Easter eggs, and animations. Set breaks. One task at a time, don’t ask to multitask.