DESIGNING IMMERSIVE 3D EXPERIENCES

A Designer's Guide to Creating Realistic 3D Experiences for Extended Reality

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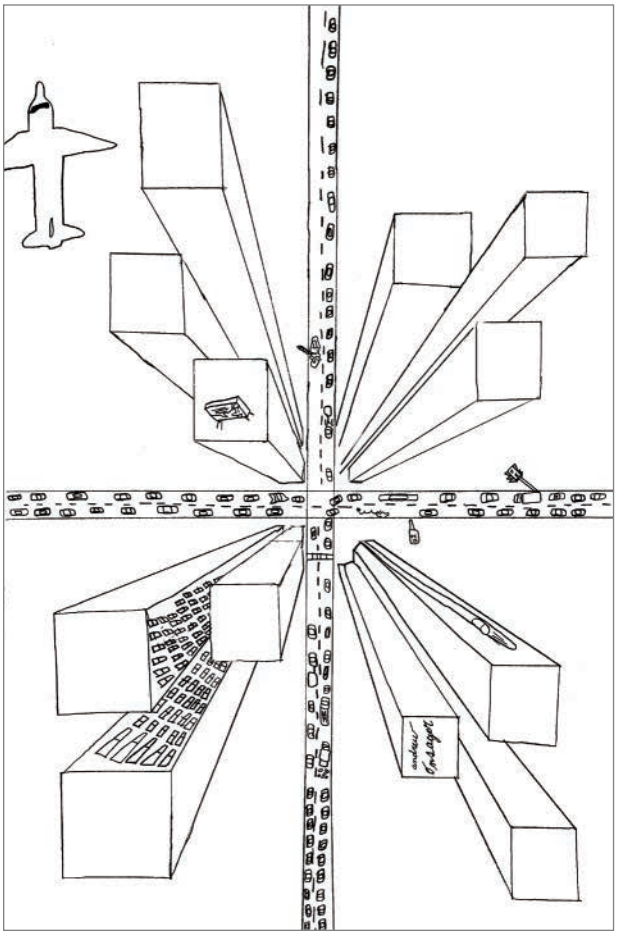

FIGURE 5.1 Dimensional Sketch. Aerial sketch of a city with an airplane flying overhead. Drawn with creative perspective by a thirteen-year-old.

Illustrator: Andrew Onsager

different level of physical abilities, it becomes even more inspiring to see how someone who isn't physically able to walk independently finds a way to move with independence. This can be done only by trying the first time and not giving up the second time around either.

If the goal is to overcome imposter syndrome, we need to start creating something—and quickly. After you have created your first paper airplane, you can no longer say that you don't know how. This is the beauty of making a prototype. It is essentially the warm-up before the actual race. There are many ways to create a prototype, but the best is to find a way that allows you to lean on something that is familiar so that you don't become overwhelmed with the technology and can focus on your ideas.

It is important to understand that the main reason you create a prototype is to answer questions. When you are creating something new, there are a lot of things that might be unknown, and the way to learn more about them is to try. Before you set off to create a prototype of any kind, you need to have a specific question in mind that you hope to answer. In the case of the paper airplane, you can start to think of multiple questions: What is the best wing shape? What is the best length? What paper weight is the most effective? I could keep adding to the list, but having too many questions within one experiment can make it hard to identify and see the change that has the most effect. While all these questions are interesting and deserve experimentation to find the best answer, they each deserve their own focus.

TIP Keep it simple, and pick one question you want answered at a time. Once you find an answer to that question, then you can move on to address another question.

If you change multiple variables and have no constant in your experimentation or research, then you cannot identify as clearly what caused the change. To test paper weight, you need a constant, such as the overall design and form of each plane, so the only variable is the paper weight. With a flying test, you can observe which plane flies the farthest. Because no other variables have changed, you can then identify that paper weight as an optimal weight to use as you continue testing.

SKETCH TRANSPARENTLY

Think about your experience reading this book: How much are you noticing the type itself compared to the ideas conveyed in the type? If designed well, the answer should be "not much at all." The design of the typography should not interfere with the delivery of the message. As Beatrice Warde, a twentieth-century scholar of typography, wrote in her essay "The Crystal Goblet,"

> Type well used is invisible as type, just as the perfect talking voice is the unnoticed vehicle for the transmission of words, ideas.[1]

The vessel that transfers information should be as transparent as a clear glass; the less you notice about the typography of a book, the more it aids in the process of communicating the book's ideas. Warde's thoughts on typography extend to other areas of graphic design, as well. You don't

1 "The Crystal Goblet or Printing Should be Invisible" from Warde, B. (1956), *The crystal goblet, sixteen essays on typography*. Sylvan Press.

want the vehicle that you are using to transmit a message get in the way of the message itself.

This concept is intriguing to explore as it relates to augmented and mixed reality. The intent is to design for a transparent interface that will allow for information to be experienced within the context of the environment that you are in (**FIGURE 5.2**). Taking this concept literally, what then could happen if you did, in fact, design for the transparent page *on* a transparent page?

Rather than sketch your design on a piece of paper, try using a transparent acetate sheet to supplement the traditional sketchbook. The intent in sketching transparently is to identify the overall interface elements that will be static while simultaneously viewing the environment around you. Using a Sharpie, you can draw out the concept wireframe for the experience on the transparency and then hold it up to see how the environment and elements interact. This will be closer to the experience you are

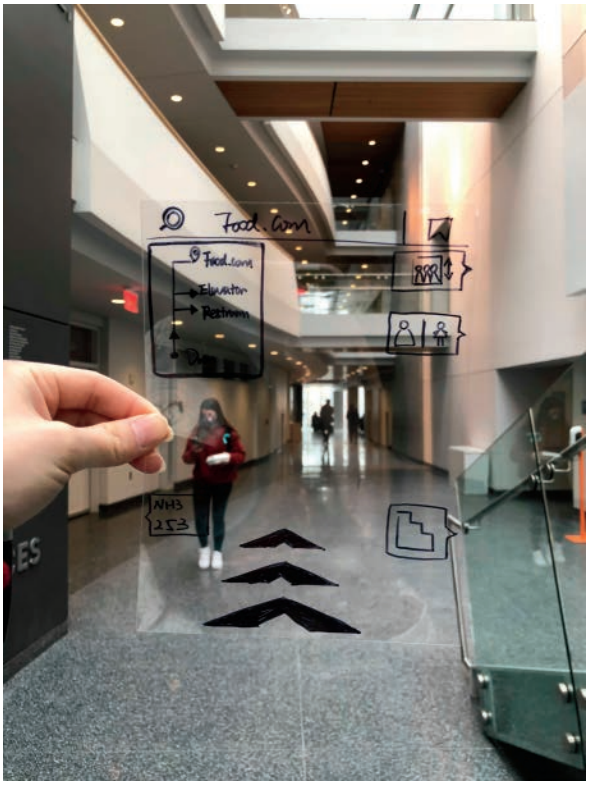

FIGURE 5.2 Transparent Sketch. A prototype of an AR navigational experience sketched on a transparency sheet and tested by holding it up in the physical space.

Photographers and designers: Jiaqi Liu and Xiaoqian Dong

designing for than working on traditional paper. This works flat, but it's even better if you find a glass window or door to hang the transparency on while you sketch, so you can see as if you are looking at the camera view from your phone or head-mounted display.

Alternatively, you can create your wireframes digitally and print them on transparencies to test them, if your printer can accommodate this workflow. You can go one step further and make the transparencies the size of the screen you are designing for so you can sketch using a more realistic display area. This will help determine size and hierarchy relationships at this stage in the process. (For those who are XR design novices, this allows you to lean on the familiar sketching process to make it easier to step into something new.)

Transparent sketching can be expanded, to accommodate different technologies such as a head-mounted display concept, for which you would need to consider sketching views for each eye. You can quickly and easily test how well placement works by holding up the transparency and looking through it. This should give you a good sense of what might work and quickly reveals issues to address. It is valuable to check this in such a low-fidelity platform, instead of getting five steps further into the process of designing, coding, and launching a device only to learn that the placement and the experience is not going to work. This serves as a transitional way to get your idea onto paper without the intimidation or distraction of technology.

TIP Trim your transparent material to be the size of the media, such as the screen size for a mobile AR experience.

We think differently while holding a pen and paper than we do when working with a trackpad or mouse. Likewise, we think differently when we are sketching out an idea on a transparency versus an opaque sheet of paper. One thing that intrigues me about this approach is how backwards it is: utilizing a component of an older piece of technology to help you embrace a new one. Working this way removes the pressure of creating something for high-tech and allows you to just focus on the idea and identifying possible design solutions in a very low-tech, low-pressure format. If you are designing for a mobile device, this helps you see the interaction of your design elements in many scenes quickly, because you can hold it up and test it easily in many test locations without writing any code. The goal of this part of the process is to start thinking about and making considerations for the challenges and potential of immersive design.

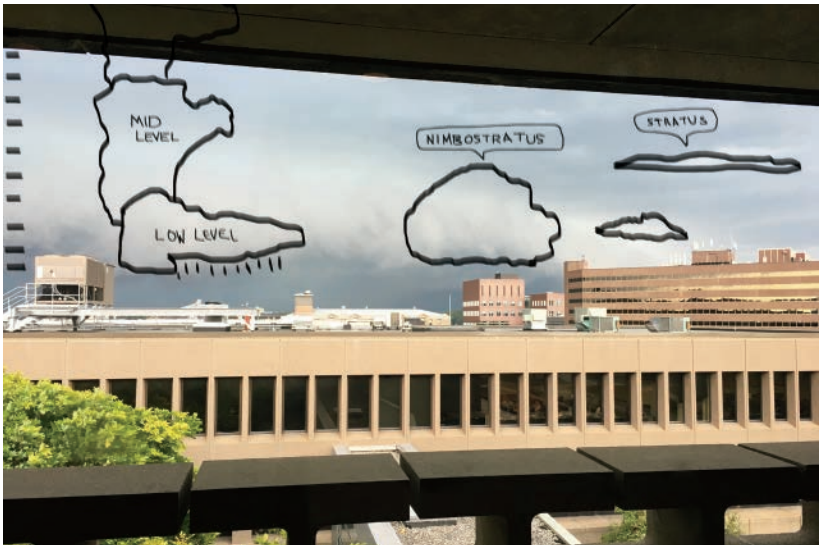

FIGURE 5.3 Window Sketches. Sketch exploration for a cloud identifier AR experience drawn on a window as a rain storm is rolling in.

Transparent sketching can be done on anything that you can see through. You could use dry erase markers or chalk markers on a window, plexiglass, unused screen protectors for a mobile device, a roll of clear vinyl, gallon-size plastic bags, or really anything that is clear and available to you (FIGURE 5.3).

THE POWER OF PROTOTYPES

Grab some supplies: paper, scissors, glue, tape, sticky notes, foam core, Play-Doh, and an open mind.

You may wonder how I could be suggesting using such basic materials to start creating for such a highly technical medium, but that is what makes quick prototyping so great. Sketching is such an important part of this process. You can really focus on exploring and pushing your ideas when just working with your hands. Once you bring in a computer into the process, you start focusing on the technology of making it work instead of the idea itself. Designing for 3D on a 2D device can be difficult to wrap your head around. Really, what better way is there to work through a three-dimensional idea than in 3D? Another prototyping challenge is being able to view the environment or model in its entirety. When you brainstorm physically with whatever materials you have and work without the restraint of any frames or screens, you will find that you are able to focus on form and relationships.

Make it fast

With paper and a few other supplies, you can create something fast; this is called **rapid prototyping**. To get started in this process, you should first select materials based on what you are creating. By this point you should have answered the why, who, what, and how as discussed in Chapter 4, "Ideation." If you are exploring an environmental space, then you could create a diorama to create a small model of the space you are trying to design for. If you would prefer to sketch more at scale, which can be helpful for spatial awareness and depth, then you might want to think bigger. My vision of a perfect way to sketch for XR involves wrapping a small room with paper and drawing out the full 360-degree design viewpoints.

Rapid prototyping
A technique that involves creating a 3D model using any number of materials to test out an overall idea quickly.

You can even surround yourself with large sheets of paper on stands that are as wide as your intended **field of view** (FIGURE 5.4). This will guide you to think about the user and their *direction of gaze*. Where will they be looking throughout the experience? Their direction of gaze may change throughout the experience, but for the initial drawing, just select a key moment of the experience to illustrate. This could be the first interaction of the experience or the key interaction of the concept, depending on what makes the most sense for the project.

Field of view (FOV)
The size, big or small, of the viewing space for an augmented experience.

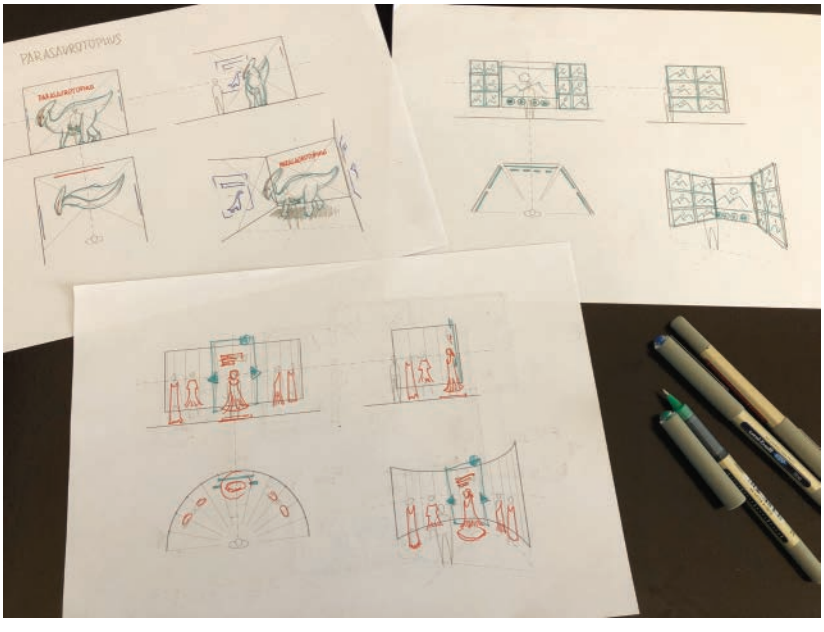

FIGURE 5.4 Field of View Sketches. Sketches exploring the visible space around the user for an augmented experience. Templates for AR/VR Sketches. www.vovakurbatov.com/articles/templates-for-ar-vr-sketches

Designer: Volodymyr Kurbatov