Designing in the Wild West
The Challenges and Opportunities for Designers of Augmented and Virtual Reality

For Di Dang, designing AR and VR applications offers the rare opportunity to be part of shaping a burgeoning industry. “I’m helping contribute to what will be the best practices and what actually works,” says Dang, a UX designer and emerging tech lead at POP, a digital agency in Seattle. “I’m an explorer in that sense, and it’s really exciting.”

Dang’s sentiments echo numerous AR/VR designers and developers, who believe they are operating in a wild west of sorts. There’s no hard-and-fast rules or conventions. Instead, there’s the chance to chart a new course for themselves, clients and users. Allison Wood, co-founder and CEO of Camera IQ, notes that nobody has the answers yet. “We’re all constantly learning,” she says.

The opportunities are huge, but without the infrastructure of a more mature industry, these creators also face significant challenges. We surveyed more than 145 professionals in the field and interviewed nearly a dozen to uncover how these AR/VR designers are doing their work, what tools they’re using and the hurdles they face with every project.
In this report, we’ve revealed the five largest challenges to AR/VR design right now:

1. Learning new tools and needing others.
2. Cumbersome communication between designers and developers.
3. Finding and creating 3D assets.
4. Rapid prototyping is rarely rapid.
5. Sharing work for feedback is difficult.

Today’s creatives in the field are problem solvers, and they’re finding workarounds to these challenges. But the process could be so much easier, and making it so is vitally important. Only when that happens, will AR and VR become accessible to more makers, clients and most importantly, users.

“I can lead a VR tour remotely and even see where the client is looking, which allows me to address things like a kitchen counter style while they’re looking at it—just as I would in a real world tour.”

– Matthew Hood, Matthew Hood Real Estate Group at Sotheby’s International Realty via Fortune.
The wide reach of AR/VR
Our survey respondents come from a range of backgrounds and industries.

Non-gaming Entertainment
Digital Agency
Other (Medical, Financial Services, E-commerce, VR Studio and Robotics)
Application and SaaS
Education and Training
Architecture, Engineering and Construction
Gaming

Growing AR/VR business opportunities...

For designers, creating AR and VR apps isn’t work solely reserved for game studios or billion-dollar brands. Companies of all sizes across many industries are starting to explore how they could put 3D, and especially AR, to use from improving e-commerce to saving money in manufacturing. Nearly every person we surveyed reported they have paid client work in 3D, indicating a rapidly maturing market. Our interviews suggest this is just the beginning.

“I think we’re still in the very early phases of this technology,” says Ally Cappiello, UX strategist with Portland-based Object Theory, which develops apps for the Microsoft HoloLens. “I think this industry will evolve exponentially – we are at the tipping point for technology innovation, adoption, and consumption.”
... Meet the 3D wall of pain

But what will it take to tip the technology into that next era of use cases, the majority of which we haven’t even contemplated yet? One thing is for certain. It will require a far more streamlined design process and tools specifically made for AR/VR prototyping. Currently, designers (and anyone else who wants to get started in 3D, for that matter) report a process so full of obstacles and so consistently called out in our research that we named it the “3D Wall of Pain.” Designers try to get started in 3D quickly slam into this formidable array of obstacles and often give up.

There is no prescribed workflow, no best practices, and certainly no easy way to go from idea to an application prototype. With traditional 2D design for mobile apps, the path is straightforward, as the designer moves from creating concepts on paper or in Sketch or Adobe CC to assembling a prototype in applications like Invision, and then sharing it to garner feedback.

With AR/VR design, the process is convoluted at best and often ends with designers simply giving up. “Everything about it is hard,” says Alysha Naples, co-founder of Tin Drum, a production studio developing content for mixed reality devices. Every step presents a new hurdle, from unknown tools to finding assets to conveying the concepts to developers.

“Designing in 3D can feel like ‘I have this idea and you have this idea, and we’re talking about it and waving our hands around, but nobody is communicating,’” says Tera Hatfield, Torch 3D’s design director, who is also a trained architect and UX designer. “It’s an incredible problem.”
A community ready to learn

Among those currently working with AR/VR, nearly half are still learning about the available hardware and software.

52% report that they work with the latest tech daily.
35% say they are familiar, but still learning.
11% categorize themselves as curious novices.

Report methodology

We surveyed more than 145 individuals about their experiences with AR/VR app design and prototyping. Among our respondents, 36% are designers, 23% executives, 20% developers, and 7% product managers. More than half are interested in both AR and VR equally, and 77% are currently working on a project that includes 3D interfaces.

They come from an array of industries including non-gaming entertainment, digital agencies, software applications and education. We supplemented our survey with in-depth interviews with several professionals in the field to better understand their daily experience with the AR/VR app design process.
Challenge 1

Learning new tools while lacking others

Nearly 50% of the people we surveyed said that authoring and creating in 3D was their biggest challenge. A lot of this is rooted in designers’ unfamiliarity with the tools currently available, as well as the fact that many of the tools designers are using aren’t made for AR/VR design. “In this space you have experienced designers who are being cut out of the process because of the tools,” Hatfield says. “They’re there in name, but their work product is being diluted – they’re hamstrung and sidelined because there are no tools for them.”

Cappiello, with Object Theory, says she often makes do with “a hodgepodge of tools.” She uses draw.io to show user flows, creates mockups in Sketch or PhotoShop for certain screens, and taps Invision for walking through the user flow, primarily for 2D interactive elements. “We’ve even used to PowerPoint to animate interactions,” she says.

When asked what design tools—both 2D and 3D—that they frequently use, the most common response from our survey respondents was the Adobe Creative Cloud, followed by Sketch. Dang, with the digital agency POP, says she took courses in Unity to facilitate her AR/VR work. “It’s been helpful for me in terms of being able to block out primitive assets and work with the developers,” she says. But ultimately, Dang notes, “there is no silver bullet” when it comes to design and prototyping tools, not to mention process.

“This going to change how we interact with computers, and it’s also going to change how we shop.”

Tools of the trade

Our survey respondents cited the design tools they rely on, in order of those most frequently used.

<table>
<thead>
<tr>
<th>Tool</th>
<th>Percentage</th>
<th>Responses</th>
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</thead>
<tbody>
<tr>
<td>Blender</td>
<td>44.1%</td>
<td>41</td>
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<tr>
<td>Maya</td>
<td>44.1%</td>
<td>41</td>
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<tr>
<td>Sketch</td>
<td>33.3%</td>
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<tr>
<td>Cinema 4D</td>
<td>30.1%</td>
<td>28</td>
</tr>
<tr>
<td>Other</td>
<td>26.9%</td>
<td>25</td>
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For 2D:
- Adobe Creative Cloud
- Sketch
- Invision
- Framer
- Marvel

For 3D:
- Blender
- Maya
- Sketch
- Cinema 4D
- Rhino

Challenge 2

Communication between designers and developers

In our interviews, many noted the communication between designers and engineers as an area of struggle. Most of the production tools were created for video game designers, and people unfamiliar with the tools can feel like they’re working in a foreign language. "I know enough Italian to read Harry Potter in it, but I don't speak or hear it well enough to have a complex discussion with another person," Naples says. "That's how many people feel designing in 3D."
That communication barrier can extend the project timeline and cost, as designers and developers attempt to get on the same page. Wood, with Camera IQ, says “prototyping ends up taking two to three times longer because of the translation from a designer who has done something in 3D and then getting the engineer to understand what (he or she) means.”

As Hatfield says, designers often resort to waving their hands, and acting out the experience they’re hoping to create. Certainly new tools could help by providing a common space for teams to meet, share and react to the application concept. But so, too, could a shared lexicon, Wood says. For instance, at this point, there is no one definition of “walkable” — a designer may use the word to describe an experience, and a developer may interpret to mean something different. “We almost need a glossary so that we communicate more efficiently,” Wood says.

“I wish I could come to the Unity developer with more clear direction or more useful assets.”

— Ally Cappiello, Senior UX designer, Object Theory

**Platforms may vary**

Survey respondents were split across the type of platforms they use when they work in 3D.

- **PC VR (Oculus Rift, HTC Vive, Windows MR)** 67.7% 67 Responses
- **Mobile AR (Apple ARKit, Google ARCore)** 57.6% 57 Responses
- **Mobile VR (Gear VR, Google Daydream)** 38.4% 38 Responses
- **HMD AR (Hololens)** 30.3% 30 Responses
Challenge 3
Finding and Creating 3D assets

It’s hard to truly understand what an AR/VR experience may look like without 3D assets. Designers want their clients to see the furniture in a room—and not a bunch of white boxes. Unfortunately, those white boxes are sometimes the best most of us can offer. “Even getting your hands on assets can be hard,” Hatfield says. The challenges here are myriad, and encompass issues of tools, files, experience, and the basic fact that most people are figuring AR/VR out.

Sixty-three percent of our survey respondents said that they rely on a mix of building, buying or finding free assets for their projects. “There still isn’t a good way for non-modelers to make 3D assets,” says Silka Miesnieks, head of Adobe’s Design Lab. Fifty-three percent of designers reported that they purchase assets from TurboSquid. Sketchfab and Google Poly/Blocks each accounted for 36% of the respondents purchases. Even with these resources, creators are still beholden to what’s currently available.

In addition to obtaining assets, there’s also differences in file size and types across devices, and no best practice for which ones to use. This can make the process of transferring files between design and development platforms cumbersome, Naples says. “It used to be a six-step process that required at least two tools,” she says.
Where’d you get those assets?
We asked survey respondents whether clients ever provided 3D assets for their AR/VR projects.

- 67% yes
- 33% no

Challenge 4
Rapid Prototyping is Rarely Rapid

Can today’s AR/VR creators get to a prototype of their idea? Absolutely. Is that process quick? Not usually. “I’m constantly talking with people about faster ways to prototype,” Dang says. The lack of tools, the communication barriers, the troubles finding assets. This is where it all comes together in a most perfect, inefficient storm.

One thing that stands out across all the interviews is that the people in this field are finding workarounds. Cappiello attaches numerous notes to wireframes in Sketch and designs in Invision to explain how all the pieces in a HoloLens app will work together. “It’s often frustrating not to have a simple prototyping tool I can use for rapid iteration,” she says. Her agency, Object Theory, usually provides clients with actual builds to test and provide feedback. “This is time consuming and difficult to do in the early stages of the project though,” she says.
Hatfield, who previously worked with Wieden+Kennedy, agrees that prototyping an AR or VR app for a client can take weeks or months. “Usually the timelines are much quicker on the agency side,” she says. Feedback coming late in the game adds to the developer time and client costs, which sometimes end up far more than anyone expected. Such hurdles don’t just blow up budgets, but they create a barrier to the technology—ensuring that only organizations with deep pockets can access AR and VR applications.

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**Prototyping tools revealed**

We asked survey respondents what tools they’re using to prototype AR/VR apps.

- 67% Unity
- 52% Paper and pencil
- 32% Other
- 16% Cinema 4D
- 11% Cardboard boxes

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As with many other products we’re exploring, how much we adopt VR in our sales process will depend on how much consumers adopt it, but the future is looking up as the headsets and content are already starting to proliferate. There is no substitute for actually being onboard one of our ships and out on the open sea, but VR is just about as close.”

– Ken Jones, Vice President of Corporate Marketing, Carnival Cruises via Fortune.
**Challenge**

Sharing work for feedback is difficult

Designers who surmount the design Wall of Pain don’t actually get much relief on the other side. Because the next step—sharing work—is by far the hardest challenge of all in terms of people involved, time wasted and money spent. Naples, who debuted a mixed reality short film at BAFTA last year, recalls that demoing scenes of the movie involved one of her teammates flying from New York to San Francisco and back in the same day to deliver a viewing device. “We needed to bring the equipment to them,” she says.

In the world of AR/VR, it’s practically impossible to hop on a conference call and walk a client through the prototype. Most of the designers we interviewed said they spend a good portion of time educating clients how to use a given device, so that they can look at the work in progress. Cappiello says that the “process tends to go awry when we can’t share anything with them until the end of the project. We may get a lot of valuable feedback, but it’s time-intensive to implement and we may have run out of budget or time to do so.”

Even when sharing a prototype is possible, designers report that they’re showing work that’s less polished than they’d prefer, principally because building out a prototype further takes too much time. “I’ve learned to be O.K. with sharing things that aren’t up to my usual standards,” Cappiello says.

“Augmented reality presents a variety of fascinating engagement opportunities, so we hope our fans download the app and try out their skills wherever they might be.”

— Melissa Brenner, SVP Digital Media, NBA via NBA.com.
Your device or mine?
Most survey respondents develop AR/VR apps on their own devices.

- 54% develop mostly on their own devices.
- 36% use client or employer devices.
- 10% borrow devices.

This finding is not surprising, given the recent upsurge in support for mobile AR from Google and Apple. However, it is notable in that it suggests the software buying patterns of the BYOD era of mobile apps will be a defining feature of AR and VR as well. Designers will pick and choose the tools they like the best, shaping the enterprise tool chest, rather than vice versa.

The revolution starts with tools

The challenge is that the industry is new, and that’s also the most exciting and enticing aspect of designing in AR/VR right now. We are all still learning, no one is yet an expert, and the fact is that anyone can contribute and create. At this stage, there should be room for all.
The right tools will help us open the doors. To a one, the people we interviewed said that the design and development process needs to be accessible to more people. They didn’t care about keeping the competition down or the talent pool small. Instead, they strongly believed that an easier design and creation process invites a larger and more diverse group of creators, which translates to better experiences and products for clients and users.

"When we think about AR/VR/AI tools, we think responsibly about the power this tech will have to fundamentally change the way we create, communicate and collaborate," Miesnieks, with Adobe, says. “Creativity is being enhanced and extended into the world around us, giving everyone skills that only trained professionals have today. Skills like animation, 3D object creation, 3D space design, will be made easy and accessible, in the same way the internet made publishing accessible to everyone. AR/VR/AI will shift us from sharing what’s on our minds to also sharing what’s in our hearts.”

Designers, developers and creatives today have the skills and ideas, and they’re certainly not limited by their imaginations. If better tools can make it easier to contribute to the growing AR/VR industry, then we all stand to benefit.