



is a user experience research and design agency, with a sweet spot for emerging technology

We deliver strategic insights, advice, and ideas that help enterprise companies understand their customers' needs and move the needle in terms of **customer experience differentiation**.



TRUSTED BY 100+ ENTERPRISE CLIENTS ACROSS MULTIPLE INDUSTRIES



Sampling of clients. All clients not listed.



LESSON 1



Ayush Bhargava, PhD Expert in Research + Testing of VR/AR Products Why your VR team needs to nail it from the get-go: SELF-REPRESENTATION + SCALE



Marina Roselli Expert in the UX of VR/AR Products



What You'll Get

- → Learn about advanced topics -SELF REPRESENTATION + SCALE
 - → What is it?
 - → How it can make/break your product experience?
 - \rightarrow How to get it right?
- → 6 pro-tips for your product team
- → Worksheet with tips & resources from this masterclass
- \rightarrow Recording to share



Self-Representation & Scale What is it? Why does it matter?

KEY LIME EMTECH MASTERCLASS | Self-Representation & Scale

6





Self-Representation matters because it's the difference between enjoyment and pure frustration.



Self-Representation matters because when the stakes are high, there can be devastating consequences for your product.





Scale matters because giving people claustrophobia won't help you sell these cars.





Scale matters because it can adversely affect emotional perception of your brand experience.



MENTAL EXERCISE Could self-representation + scale in your design be adversely affecting its user experience?

Self - Re.pre.sen.ta.tion

noun

An interactive or social representation of a user

synonyms noun. self-avatar



Self-Representations in VR



Any graphical artifact that represents a part of your body or your full body can be considered a self-representation or self-avatar







Self-Representations in VR



- They are part of the fun, especially in social VR
- They improve presence and immersion







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Easy to Mess-up Self-Avatars





Digging Deeper - Virtual Hand Research



- Lougiakis et al. (2020) tested effect of virtual hand representations on task performance in VR
- Task: Pick up object and drop in the slot on right
- Hands and controller representation performed better than sphere





Digging Deeper - Affordances + Safety



- Self-avatars help us comprehend affordances
- Affordances are cues that hint at actions we can perform in an environment based on our body dimensions, strength, available tools, etc.
 - Eg: Entering a standard door vs a doggie door; shooting a 3-pointer vs a free throw, etc.
- Lin et al. (2013) studied the effect of full body self-avatars on judging when to step off a ledge
- Participants with self-avatars made more realistic judgments
 - Without self-avatars: Step off the ledge at 50% of their eyeheight
 - With self-avatars: Step off the ledge at 25% of their eyeheight







Knowing when to step off a ledge

Learning to use a scalpel



BELF-REPRESENTATION How do I know if we're getting it right?



METRICS

- Body-ownership: "Does the representation feel like it's mine?", "Does it move based on my movements?"
- Presence: "Does the representation make me feel like I am in the environment?"
- Agency: "Does the representation make me feel like I am affecting the events around me?"
- Usability: "Am I able to complete the task at hand using my representation?"

Methods

- Surveys (SUS, Avatar Embodiment Questionnaire, etc.)
- Post-session interviews
- Objective simulation data (movements, time to complete, etc.)

Self-Avatars Are Part of the Equation



- For a virtual environment to feel realistic an accurate sense of scale is important
- Sense of scale comes from the perception of spatial properties including:
 - Size
 - Distance
 - Depth
 - Volume



Sca·le

Virtual environment scale needs to be truthful for users to act like they do in the real world

Size and distance is often under or overestimated in VR



Understanding Scale in VR

- Bhargava et al. (2020) compared judgments of walking through a doorway in VR to the real world
- Participants needed wider doors to be deemed as passable in VR
- Bhargava et al. (2019) compared judgment behavior of walking through doorway in VR to the real world
- Participants needed to observe the VR door from a closer distance to produce the same accuracy in their judgements as when they observed the real world door







Self-Avatar + Scale



- Self-avatars affect how we perceive the environment and help us understand how to interact in it
- Banakou et al. (2013) studied the effect of self-avatars on size
 - Participants embodied a child avatar or an adult avatar the size of a child
 - They judged the size of objects in VR
 - Child avatars overestimated size more than adult avatars



Enhancing Spatial Perception in VR



Various visual cues affect how VR Environments are perceived

- Shadows
- Occlusion
- Perspective
- Parallax
- Texture Gradient



Enhancing Spatial Perception in VR

V

- Screen resolution
- Refresh rate
- Field of View
- Eyeheight







BORNE How do I know if we're getting it right?

Perceptual Evaluations of Scale



METHODS

- Verbal Estimates in Units
 - Estimate measurement after viewing an object

Gestures-based Estimates

• Estimate size by hands after viewing an object

• Blind Walking

• Walk to the target blindly after viewing it

Affordance Judgments

• Most appropriate as we think and make judgments based on affordances

PRO-TIP

Always identify what your baseline for comparison is

- Is it real world judgments of the same kind?
- Is it the actual size of the object or the actual distance?



6 ways to nail it from the get-go Self-Representation + Scale

- 1. Think about what the self-representation needs to convey and how it will affect task completion e.g. does it need to convey how to hold objects or just show where your hands are?
- 2. Self-avatars can be complex, consider the tradeoffs of simpler versions
 - e.g. do you need to have a full body or will just the upper body work?
- 3. Evaluate if the self-avatar is fulfilling its purpose e.g. use task performance and usability measurements



6 ways to nail it from the get-go Self-representation + Scale

- 4. Consider the importance of scale in the experience
 - e.g. is accurate scale perception important to the task? Real Estate vs. Fitness Games
- 5. Use as many visual cues as possible
 - e.g. use shadows to effectively convey positioning; not all cues need to be high-def
- 6. Perceptually evaluate the environment scale e.g. use affordance judgment comparisons if possible





Q&A with Experts

Let's tackle some problems together!



Marina Expert in the UX of VR/AR Products

Ayush Expert in Research + Testing of VR/AR Products



See you at the next class!

More burning questions? Let us know at emtech@keylimeinteractive.com

LESSON 2 Why your VR team needs to nail it from the get-go: COGNITIVE LOAD + USER ACCLIMATION