Designing Audio-Haptic Experiences

Hugo Verweij, Sound Designer
Camille Moussette, Interaction Designer
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What is an Audio Haptic experience?
What is an Audio Haptic experience?
Three guiding principles
What is an Audio Haptic experience?
Three guiding principles
Techniques
What is an Audio Haptic experience?

Three guiding principles

Techniques
Can you feel it?
Haptic Design 101
Haptic Design 101
Haptic Design 101

Continuous
Haptic Design 101
Haptic Design 101

Transient
Haptic Design 101

Transient
Haptic Design 101

Transient
Haptic Design 101

Transient
Haptic Design 101

Transient
Haptic Design 101

Round, Soft

Transient
Haptic Design 101

Round, Soft

Transient

Crisp, Precise
Haptic Design 101

Round, Soft

Crisp, Precise
Haptic Design 101
Haptic Design 101

Haptic Intensity
Haptic Design 101
What is an Audio Haptic experience?

Three guiding principles

Techniques
Three Guiding Principles
Three Guiding Principles

Causality
Three Guiding Principles

Causality
Harmony
Three Guiding Principles

Causality

Harmony

Utility
Causality
Causality

“For feedback to be useful, it must be obvious what caused it.”
Cause

Effect
<table>
<thead>
<tr>
<th>Cause</th>
<th>Effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>Foot colliding with the ball</td>
<td></td>
</tr>
</tbody>
</table>
Cause  
- Foot colliding with the ball

Effect  
- Sound of impact
- Feel of impact
Cause and Effect
Cause and Effect

Qualities of interacting objects
Cause and Effect

Qualities of interacting objects

Dynamics of the interaction
Cause and Effect

Qualities of interacting objects

Dynamics of the interaction

Environment
Needs movie of Apple Pay confirmation animation + sound
Needs movie of Apple Pay confirmation animation + sound
Sound

Haptic
Harmony
Harmony

“It feels the way it looks the way it sounds.”
Real World
Real World

Visual
Audio
Haptic
Real World

Visual
Audio
Haptic

Digital World
Real World
Visual
Audio
Haptic

Digital World
Visual
Real World

- Visual
- Audio
- Haptic

Digital World

- Visual
- Audio
Real World
- Visual
- Audio
- Haptic

Digital World
- Visual
- Audio
Real World
- Visual
- Audio
- Haptic

Digital World
- Visual
- Audio
- Haptic
  Synchronization
Real World
Visual
Audio
Haptic

Digital World
Visual
Audio
Haptic
Synchronization
Harmony
Interactions, Visuals, Audio and Haptics
Harmony
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Harmony
Interactions, Visuals, Audio and Haptics
Harmony
Interactions, Visuals, Audio and Haptics
Digital Crown Haptic
Digital Crown Haptic
Visualization of Watch crown sound + haptic
“Add audio and haptics that provide clear value to your app experience”
Utility

Moderation

Focus
Utility

Moderation

Focus

Keep it simple
Guiding Principles
Guiding Principles

Causality
Guiding Principles

Causality

Harmony
Guiding Principles

Causality
Harmony
Utility
What is an Audio Haptic experience?

Three guiding principles

Techniques
Core Haptics Primitives
Core Haptics Primitives

Transient
Core Haptics Primitives

Transient

Continuous
Core Haptics Transient
Core Haptics Transient
Core Haptics Transient

Haptic Sharpness

Haptic Intensity

0.0

1.0
Core Haptics Transient

Haptic Sharpness

Round, Soft

Crisp, Precise

Haptic Intensity

0.0

1.0

Haptic Sharpness
Core Haptics Continuous
Core Haptics Continuous

Haptic Intensity

0.0

0.0

Haptic Sharpness

0.0

1.0
Core Haptics Continuous

Haptic Sharpness vs. Haptic Intensity

Haptic Sharpness:
- 0.0
- 1.0

Haptic Intensity:
- 0.0
- 1.0
Sound Building Blocks
Sound Building Blocks
Sound Building Blocks
Sound Building Blocks
Sound Building Blocks
Sound Building Blocks
Sound
Anticipation

Sound

Haptic
Anticipation

Sound

Haptic
Number of Events

4 Events
Number of Events

4 Events
Haptic Priming

Sound

Haptic
Haptic Priming

Sound

Haptic
Haptic Priming

Sound

Haptic
Contrast—Left

Sound
Contrast—Left

Sound

Haptic
Contrast—Left

Sound

Haptic
Contrast—Right
Contrast—Right

Sound

Haptic
Contrast—Right

Sound

Haptic
Contrast—Right

Sound

Haptic
Camille:
yesterday. Overall it has been very relaxing!!

Hi Hugo, what are you up to tonight?

Hugo:
Hey Camille, first dinner with family, then fireworks! 🎆

Camille:
Sounds nice! Where are you watching?

Hugo:
Golden Gate Bridge!! You should join us!

Camille:
Sounds like fun! See you there!

Hugo:
See you then.
Camille:
yesterday. Overall it has been very relaxing!!

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Camille: Sounds nice! Where are you watching?

Hugo: Golden Gate Bridge! You should join us!

Camille: Sounds like fun! See you there!

Hugo: See you then.
A Few More Thoughts
Collaborate
Experience It
Experiment
<table>
<thead>
<tr>
<th>Event</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Core Haptics Lab</td>
<td>Thursday, 11:00</td>
</tr>
<tr>
<td>Core Haptics Lab (2)</td>
<td>Friday, 9:00</td>
</tr>
</tbody>
</table>

More Information

developer.apple.com/wwdc19/810