Quantifying the impact of interactivity in digital out-of-home advertising

ultraleap

Executive summary

In 2018, spend on digital out of home (DOOH) advertising overtook traditional out of home advertising.[1] But with digital screens everywhere, advertisers are now looking for new ways to connect with customers.

Almost every prediction points to interactive and experiential advertising as a key trend in DOOH.[2] Given the dramatic effect interactivity has had in other channels (such as mobile and TV advertising), it would be expected that the impact of interactive digital signage would also be positive.

There are very few studies, however, that analyse the impact of interactive versus static digital signage. Since interactive digital signage typically involves additional hardware, software or creative development costs, this is an important piece of information.

Our research into the impact of interactivity in a DOOH installation at a major movie theater in downtown Los Angeles demonstrates that interactive significantly outperforms static digital signage. This is true across a range of measures, from dwell time all the way through to purchase intent and ROI.

We also found that interactive DOOH generates a new form of audience data. This is the length of time users' hands are interacting with content, which we term i*nteraction time*. It's a near-field measurement that can be used in conjunction with far-field measurements generated by other audience measurement platforms (such as Quividi) to give a more nuanced picture of audience engagement.

Millennials are digital natives looking for richer ways to connect with brands. Our research shows that in DOOH, interactive and experiential campaigns can be proven to translate into meaningful commercial results.

Saurabh Gupta
Director of Product, Ultraleap

"Creative and engaging campaigns allow audiences not only to observe but to interact, be entertained and build relationships with brands in real life."

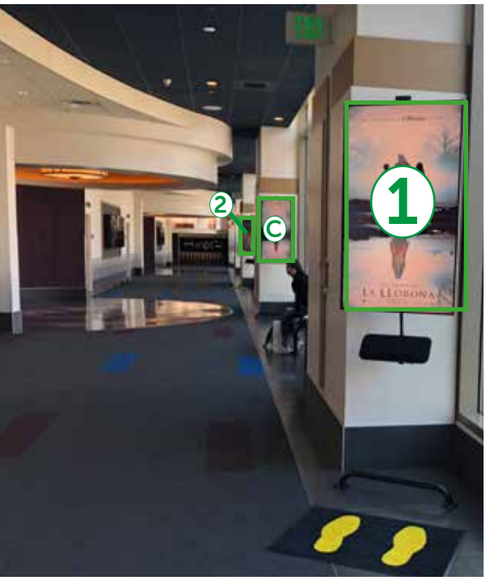
J C Decaux[3]

[1] https://oohtoday.com/2019-ooh-trends-to-watch-out-for/

[2] See for example, https://www.dooh.com/dooh-updates/is-2019-the-year-for-digital-ooh/, https://oohtoday.com/2019-ooh-trends-to-watch-out-for/, https://www.emcoutdoor.com/blog/2018/12/5-important-trends-out-of-home-2019/

[3] https://www.jcdecaux.com/brands/trends-out-home

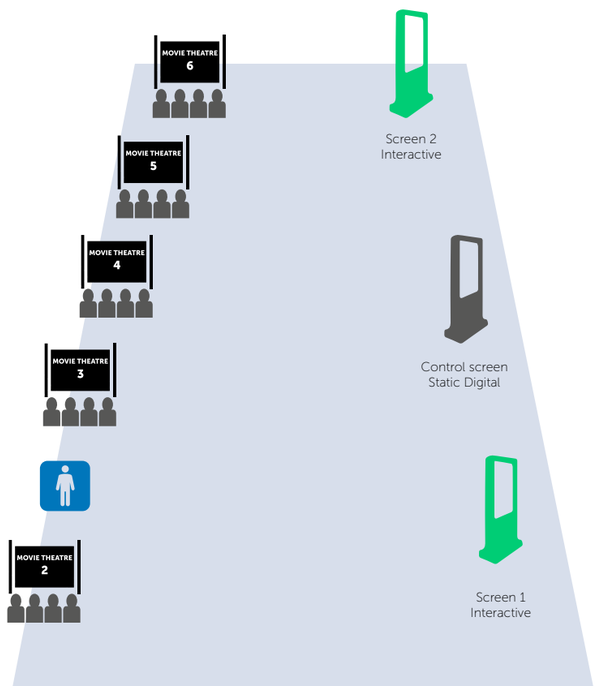
Study background

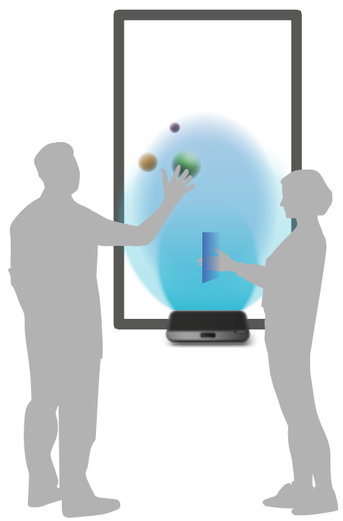


The study took place in a top-tier, 14-screen multiplex cinema in downtown Los Angeles. Ultraleap installed two interactive digital signage installations and one static installation in one of the corridors leading to the auditoriums.

The two test systems combined an LCD screen and an interactive STRATOS™ Inspire haptic module. The control screen (C on the image to left) displayed a static version of the content that users could not interact with.

Traffic volumes varied. There were times of high traffic but also times when there was no one in the corridor at all. It is important to consider this when comparing the data to other contexts such as malls.





STRATOS Inspire haptic module

STRATOS Inspire incorporates both hand tracking and mid-air haptics. Mid-air haptics is a “virtual touch” technology that uses ultrasound to create the sensation of touch in mid-air.

The haptic module transforms 2D digital screens into 3D interactive canvases by creating tactile interaction zones in mid-air. Customers can use 3D gestures to interact with content and experience haptics on their bare hands. No handheld devices or wearables are required and customers do not need to be in contact with any surface.

Audience data

During the 2 months of the study over 150,000 moviegoers had the chance to experience interactive digital signage advertising the live releases *Shazam!*, *The Curse of La Llorona* and *Pokémon: Detective Pikachu*. Each had approximately a 3-week run (2 weeks pre-release plus 1 week post-release).

The audience was diverse, with a roughly 50-50 split between genders and a mix of individuals, groups of friends and families. Around 65% of the audience was under 35.[4]

Data on audience engagement was collected through:

- **Quividi's Audience Measurement Platform measuring views and attention time[5]**
- **Bespoke analytics software built into the experience that measured interaction starts/stops and the duration of interactions with the content**
- **Survey of 316 moviegoers conducted by independent research company ERm Research. This compared the engagement of a test group (who were exposed to interactive digital signage) to a control group (who were only exposed to static digital signage). It also explored the reactions of those who recalled interacting with the interactive digital signage installations in greater depth. N.B. The ERm survey investigated *Detective Pikachu* and *Shazam!* only.[6]**
- **User observation and intercept interviews by the Ultraleap team on the ground**

153,000

The number of moviegoers exposed to our interactive movie posters over the 2 months of the study.

[4]Gender split, age distribution and demographic profile based on ERm survey (see below). Mix of individuals, groups and families based on user observation and intercept interviews by the Ultraleap team on the ground.

[5]See https://quividi.com/.

[6]ERm Research (see http://www.ermkt.com/) collected contact information from moviegoers at the multiplex cinema on Thursday, May 2 and Saturday, May 4, 2019. Based on the movie/showtime that each moviegoer attended, they were determined to be test sample (those seeing movies in auditoriums 2-7, who walked past the Ultraleap displays to get to their movie) or control sample (those in auditoriums 8–14 or 1, who did not). The next day, moviegoers received an invitation by email to complete a follow-up survey in exchange for a $10 Amazon gift card. The small group of moviegoers who were in the control sample but reported seeing the Ultrahaptics displays were excluded from the sample entirely. In all, 316 moviegoers completed the survey (129 test and 182 control). Data in the test and control conditions were balanced to ensure the groups were demographically and psychographically equivalent.

Pokémon: Detective Pikachu

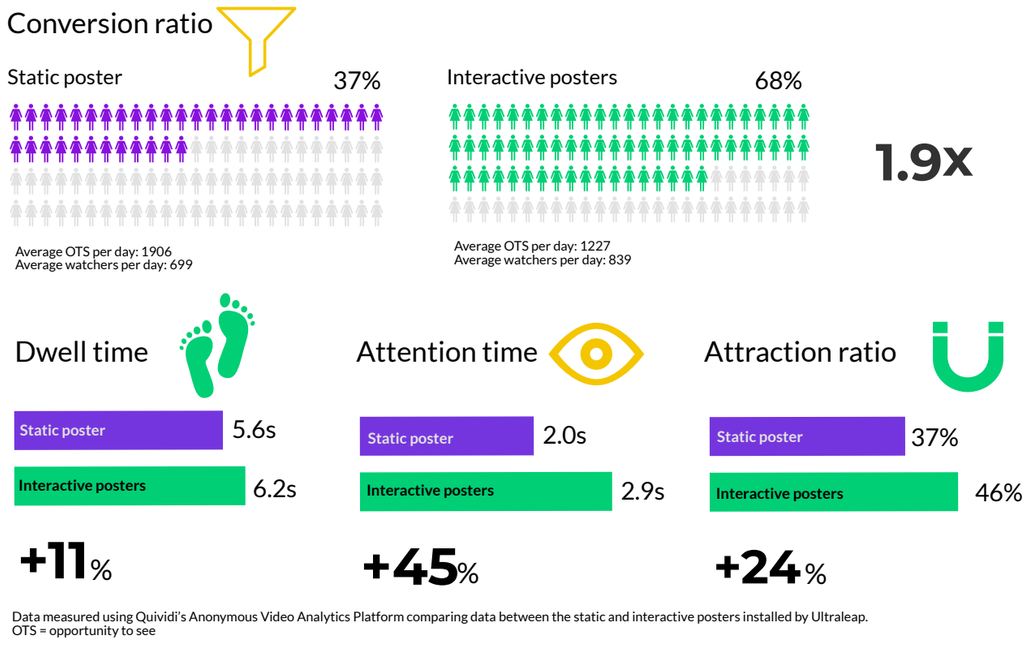
Detective Pikachu is part of the Pokémon franchise. Pokémon is the highest-grossing entertainment franchise of all time,[7] and characters such as Pikachu are known and loved worldwide.

In Ultraleap's interactive digital signage, users were tasked to use the onscreen magnifying glass to discover objects in a Ryme City streetscape. The magnifying glass tracked the user's hand as they searched for clues. An electric haptic sensation (mimicking Pikachu's electric attack in the franchise) signified success.

The aim was to find three objects and complete the experience as quickly as possible. The final screen showed how long it took the user to find all the objects and congratulated them on completing the experience.

[7] https://movieweb.com/pokemon-franchise-highest-grossing-all-time/

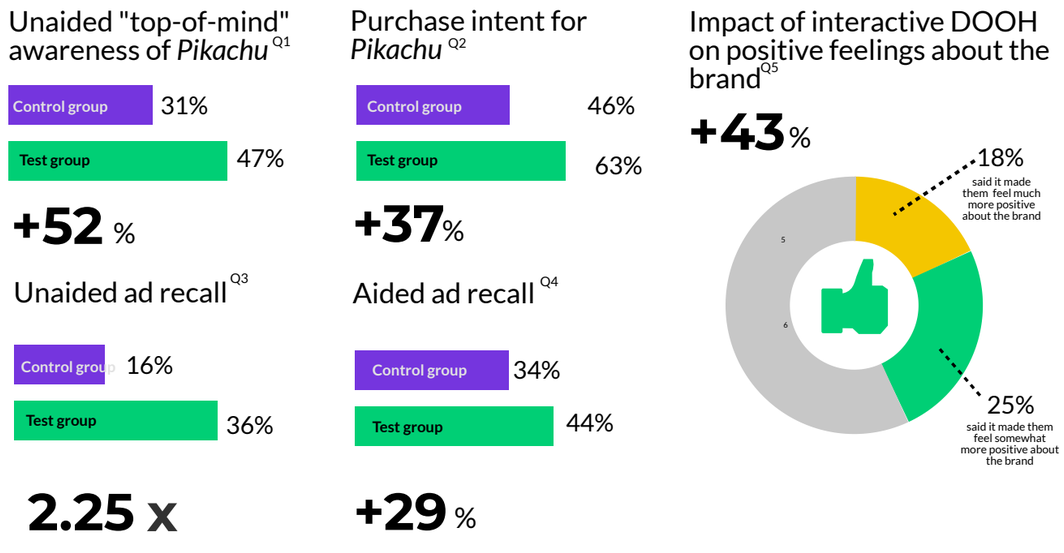
Audience analytics



Data measured using Quividi's Anonymous Video Analytics Platform comparing data between the static and interactive posters installed by Ultraleap.
OTS = opportunity to see

Survey results

The **control group** walked past static DOOH advertising *Detective Pikachu* to get to their movie.
The **test group** walked past interactive DOOH advertising *Detective Pikachu* to get to their movie.



Data from ERm Research independent study measuring 316 moviegoers' response.

Q1: *Please list some movies that you know are currently playing (or will be playing soon) in theaters near you.* ***Q2:*** *How interested are you in seeing each of these films in a theater? If you have already seen a particular movie, please tell how interested you are in seeing that movie again. ("Definitely interested" + "Probably interested").* ***Q3:*** *To the best of your memory, what movies were featured as part of the advertising you saw in the lobby/common areas of the theater?* ***Q4:*** *Below is a list of movies you may or may not have seen advertised at the theater. To the best of your memory, which of the following did you see an advertisement for in the lobby/common areas of the theater?* ***Q5:*** *How did the Detective Pikachu haptic display impact your feelings about the people behind Detective Pikachu (The Pokémon Company and Warner Bros)?*

Interaction and engagment

The interactive digital signage had almost double the conversion rate (i.e. the number of passers-by who glanced at the content) of the static digital signage. These conversion rates are also significantly higher than the industry benchmark of 35%.[8]

This was partly down to effective and innovative methods to draw users in and communicate that the digital signage display was interactive. These included footprints on the floor and a designed on-screen "call to interact" that displayed animated "ghost" hands to communicate and entice the moviegoer to interact with content.

Our qualitative research also suggested the "honeypot" effect had an impact. This effect occurs when some users are interacting with interactive digital signage, which catches the attention of observers. Curiosity then leads to further interactions.

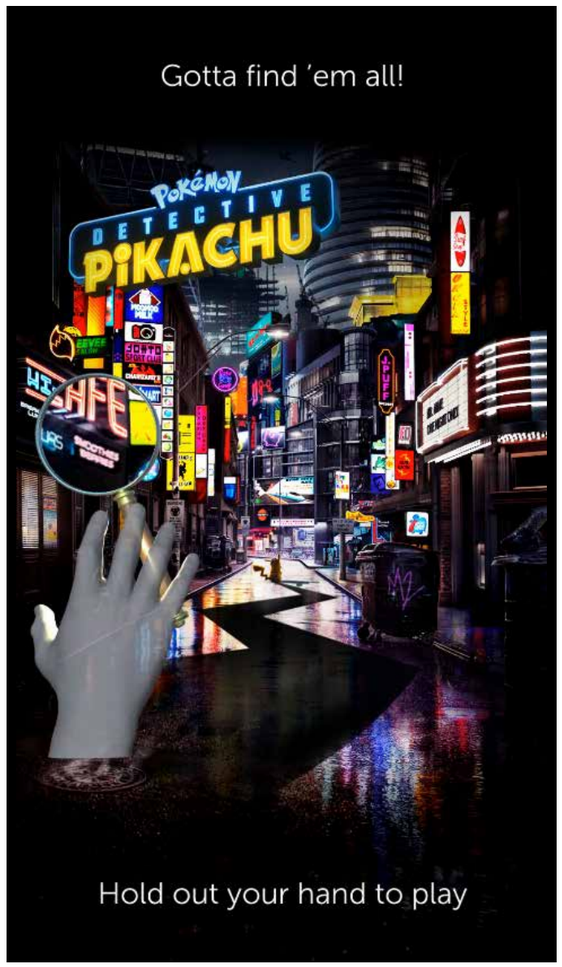
The gamification was easily understood and effective at creating engagement. It was observed to be a very social experience, with crowds forming around the interactive digital signage as friends searched for hidden objects together. There was an 11% increase in dwell time and a 45% increase in attention time over the static display. This led to a 24% increase in attraction ratio.

Brand Impact

Getting users engaged with content is key for any advertising campaign but the main aim is, of course, for users to take away the key messages.

The interactive *Detective Pikachu* poster dramatically increased brand awareness (+52%), advertisement recall (2.25x) and purchase intent (+37%). Among those who interacted, interactive digital signage increased positive feelings about the Pokémon brand by 43%.

Visitors commented, in particular, on the appeal of being able to "feel" Pikachu's lightning attacks and connect with a loved character in a new and tangible way.



"It ... felt more realistic, like I was feeling something real while making the action."

"It feels like Pikachu!"

Visitor quotes

[8] https://www.researchgate.net/publication/251231398_Audience_Measurement_of_Digital_Signage_Quantitative_Study_in_Real-World_Environment_Using_Computer_Vision

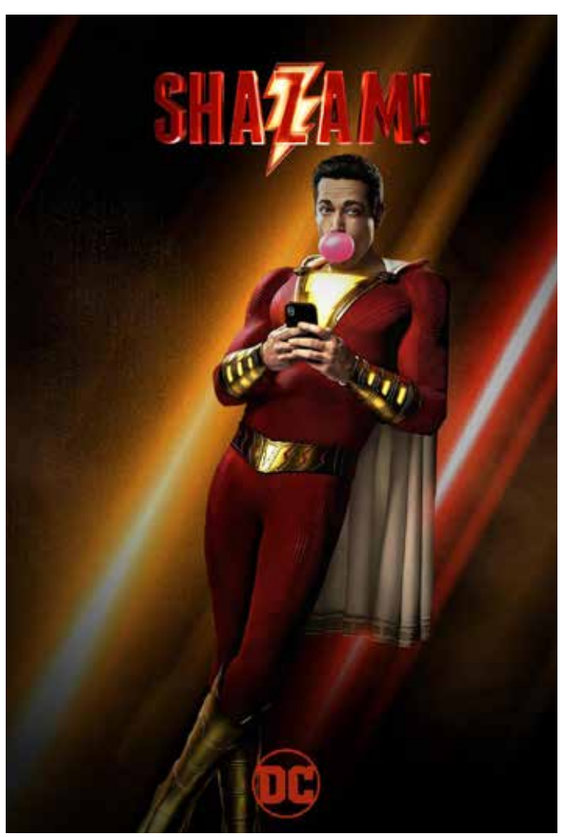
Shazam!

The second DOOH installation advertised *Shazam!*, a superhero movie based on DC Comics character Shazam. The interactive digital signage made users feel as though they themselves had Shazam's superpowers by enabling them to shoot electricity from their fingertips.

When the user placed their hand into the interaction zone they saw a virtual hand on-screen tracking their hand movements. Electricity fired out of the virtual hand and destroyed objects (the Shazam logo) on screen. At the same time, users felt an "electric" sensation on their actual hands.

4.8x

increase in advertisement recall for *Shazam!* interactive DOOH compared to static DOOH



Audience analytics

Conversion ratio

Static poster 35%

Average OTS per day: 2089
Average watchers per day: 744

Interactive posters 69%

Average OTS per day: 1236
Average watchers per day: 853

1.9x

Dwell time

Static poster 5.1s

Interactive posters 6.8s

+33%

Attention time

Static poster 1.9s

Interactive posters 3.3s

+74%

Attraction ratio

Static poster 37%

Interactive posters 47%

+27%

Data measured using Quividi's Anonymous Video Analytics Platform comparing data between the static and interactive posters installed by Ultraleap.
OTS = opportunity to see

Survey results

The **control group** walked past static DOOH advertising *Shazam!* to get to their movie.
The **test group** walked past our interactive DOOH advertising *Shazam!* to get to their movie.

Unaided "top-of-mind" awareness of *Shazam!* Q1

Control group 25%

Test group 40%

+60%

Purchase intent for *Shazam!* Q2

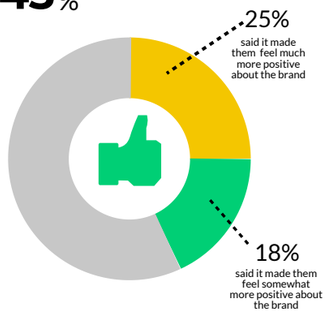
Control group 54%

Test group 62%

+15%

Impact of interactive DOOH on positive feelings about the brand Q5

+43%



Unaided ad recall Q3

Control group 6%

Test group 29%

4.8x

Aided ad recall Q4

Control group 19%

Test group 36%

+89%

Data from ERm Research independent study measuring 316 moviegoers' response.

Q1: *Please list some movies that you know are currently playing (or will be playing soon) in theaters near you.* ***Q2:*** *How interested are you in seeing each of these films in a theater? If you have already seen a particular movie, please tell how interested you are in seeing that movie again. ("Definitely interested" + "Probably interested").* ***Q3:*** *To the best of your memory, what movies were featured as part of the advertising you saw in the lobby/common areas of the theater?* ***Q4:*** *Below is a list of movies you may or may not have seen advertised at the theater. To the best of your memory, which of the following did you see an advertisement for in the lobby/common areas of the theater?* ***Q5:*** *How did the Shazam! haptic display impact your feelings about the people behind Shazam! (DC Comics and Warner Bros)?*

Interaction and Engagement

The impact of interactivity was significant, with twice as many people looking at the interactive digital signage compared to the static version. Dwell time increased by 33%, leading to a 74% increase in attention time and a 27% increased attraction ratio.

Users were observed convincing friends and family to try the experience after enjoying it themselves. Sometimes this effect was so strong that queues formed. Young children would often continue to engage repeatedly until their parents (sometimes physically!) pulled them away.

Brand Impact

Similarly to *Detective Pikachu*, the *Shazam!* interactive poster increased brand awareness (+60%), advertisement recall (4.8x) and purchase intent (+15%).

It was noticeable that the uplift in purchase intent for *Shazam!* attributable to interactive digital signage was less pronounced than for *Detective Pikachu* (+15% compared to +37%).

We attribute this to the timing of the ERm study, which took place shortly *before* the *Detective Pikachu* opening but some time *after* the *Shazam!* opening. By the time of the ERm study other marketing activity, reviews and word-of-mouth recommendations had already raised purchase intent for *Shazam!*, whereas with *Detective Pikachu* much of this was yet to happen.

This meant that for the ERm survey group, the *Shazam!* interactive digital signage had less opportunity to make an impact on purchase intent than *Detective Pikachu* did.

The Curse of La Llorona

The final installation advertised horror movie *The Curse of La Llorona* (the "weeping woman"). The movie is based on a famous Latin American folk story.

When users placed their hand into the interaction zone they saw a virtual hand on-screen tracking their hand movements. They could move "their" hand through water on-screen.

The water was visibly disturbed by their hand movements and we simulated the sensation of feeling water on your hands. The sound of the water was also audible. After 20 seconds a jump scare appeared – the face of the "weeping woman" alongside a loud scream.

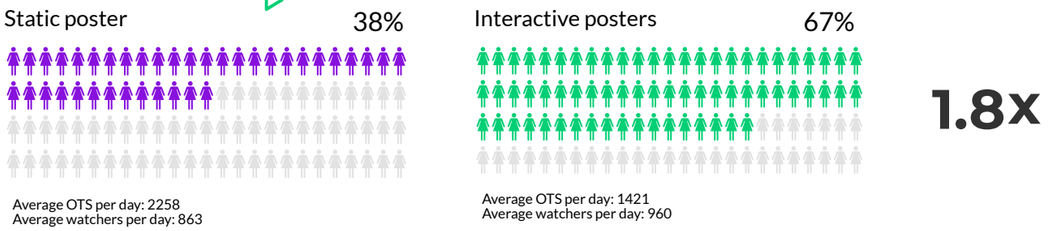
In comparison to the fully gamified *Detective Pikachu* poster, *The Curse of La Llorona* was an open-ended experience that users could dive in and out of. They did not have to play for a specified amount of time before gaining from the experience.

"It was cool and creepy, it gave me goosebumps."

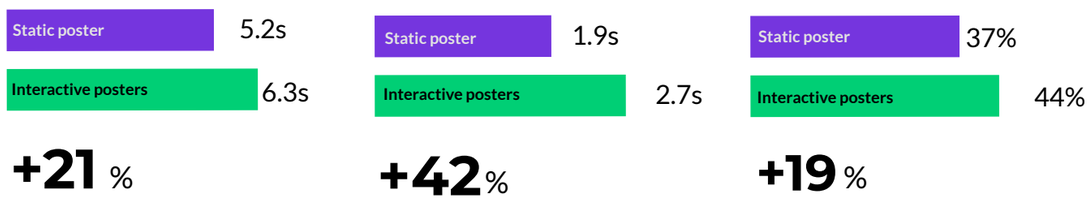
Quote from child visitor telling his mum to try it

Audience analytics

Conversion ratio



Dwell time



Attention time

Attraction ratio

Data measured using Quividi's Anonymous Video Analytics Platform comparing data between the static and interactive posters installed by Ultraleap. (N.B The ERm survey into brand recall, ad recall, purchase intent and brand favourability did not include *The Curse of La Llorona*.)
OTS = opportunity to see

Interaction and Engagement

The *La Llorona* experience had a different type of interaction to either *Detective Pikachu* or *Shazam!*. Despite the fact that the interaction design was relatively simple, the data was still strong with 1.8 times as many people glancing at the interactive digital signage compared to the static digital signage, and increases of 21% in dwell time, 42% in attention time and 19% in attraction ratio.

We observed users interacting with the DOOH installation together, making hand gestures to each other. The content of the interactive poster also sparked conversation about the folklore of La Llorona and demonstrably generated excitement around the film.

What audiences thought of our interactive DOOH

The majority of moviegoers found interactive DOOH engaging, unique and modern. Most enjoyed the element of surprise, with some people describing the installations as being "from the future". They appreciated how family-friendly the interactive posters were and even those who did not interact themselves recalled seeing kids having fun with the installations.

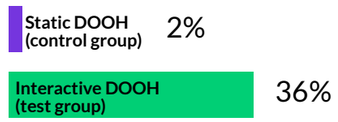
When asked what movies featured as part of the digital displays at the cinema, 36% of the test group (who had been exposed to our interactive digital signage) specifically recalled *Detective Pikachu* and/or *Shazam!*.

In comparison, only 2% of the control group (only exposed to static digital signage) recalled these movies—a dramatic 18-fold increase in recall.[9]

"It was very entertaining and a fun, interactive way to pass the time before the movie."

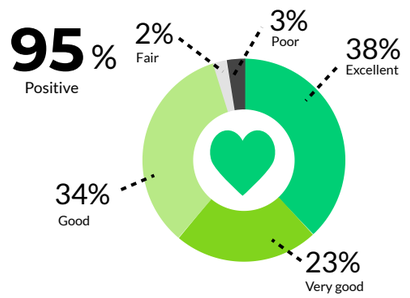
Visitor quote

Recall of interactive compared to static digital advertising Q1



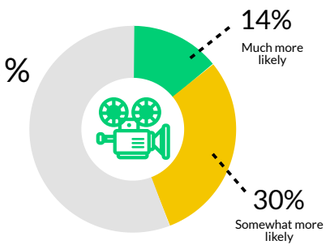
18x

Rating of the interactive DOOH experience Q2



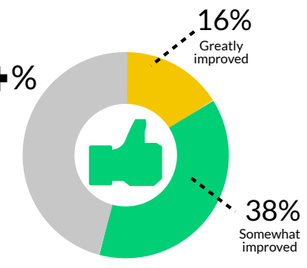
Likelihood of selecting a movie theatre with interactive DOOH Q3

+45%



Improvement of experience with interactive DOOH Q4

+54%



Those who interacted with the interactive DOOH agreed or somewhat agreed: Q5

91%
They're engaging

85%
They're unique

63%
They improve the experience of going to the movies

82%
They're modern/ cutting-edge

61%
They make me more likely to want to find out about a movie

57%
They make me more likely to talk to friends about a movie

64%
They're immersive

48%
They make me more likely to see a movie

Data from independent study conducted by ERm Research measuring 316 moviegoers' response to the interactive posters. Based on the movie/showtime that each moviegoer attended, they were determined to be test sample (those seeing movies in auditoriums 2-7, who walked past the interactive posters to get to their movie) or control sample (those in auditoriums 8–14 or 1, who did not). Data in the test and control groups were balanced to ensure the groups were demographically and psychographically equivalent. Participants in the test group who recalled the interactive displays and had interacted with them were then asked further questions about their impact.

***Q1:** To the best of your knowledge what movies were featured as part of the digital displays?* ***Q2:** Based on your experience/based on watching others, how would you rate the haptic display(s)?* ***Q3:** When selecting a movie theater in the future, would you be more likely to select a movie theater that featured haptic display(s)?* ***Q4:** What impact would you say the haptic display(s) had on your experience at the theater overall?* ***Q5:** How much do you agree with the following statements about haptic displays?*

[9]All data from ERm Research survey measuring 316 moviegoers' response.

Interaction time

A new way of measuring how actionable a campaign is

Measuring the impact of DOOH is a challenge, and the data story has to solve three key metrics (the 3As):

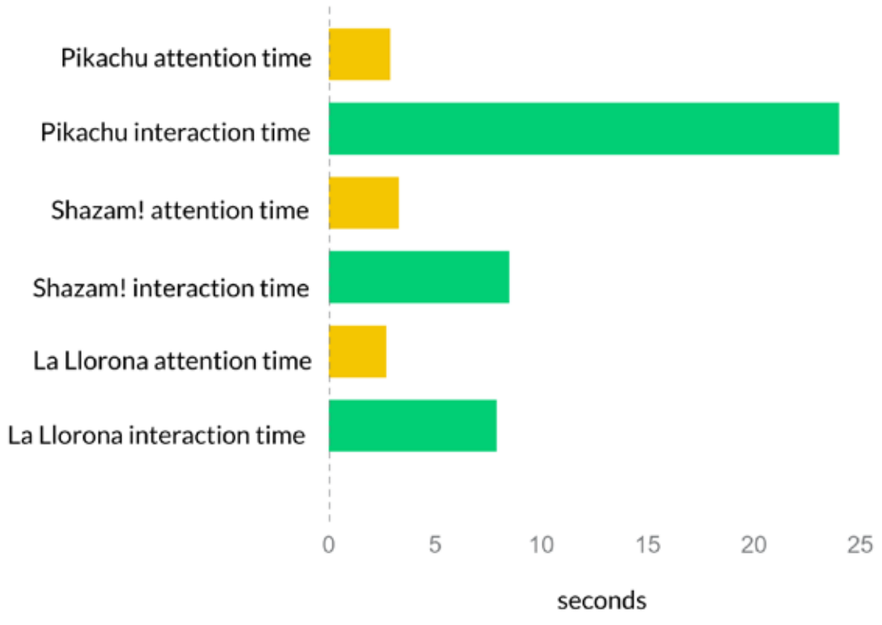
1. **Addressable:** Are the right messages being shown to the right audiences?
2. **Actionable:** Are they noticing and reacting to this message?
3. **Attributable:** Did the message lead to a downstream sale or action?

When audiences are interacting with rather than passively observing digital signage, it becomes possible to measure more accurately how actionable a campaign was.

Our interactive posters had bespoke analytics software built into the experience that measured interaction starts/stops and the duration of interactions with the content. Significantly, the interaction times measured were consistently longer than the attention time audience data analytics captured using the Quividi Audience Measurement Platform (as outlined earlier in the whitepaper).

This suggests that for interactive digital signage installations, a near-field measurement of interaction time can be usefully deployed in conjunction with far-field measurements such as attention time to give a richer and more nuanced picture of audience engagement.

Attention time metric compared to interaction time metric



Validating the impact of mid-air haptics

STRATOS Inspire includes both hand tracking and mid-air haptics. While the majority of the pilot explored the value of the two technologies working together, we also used the interaction time metric to evaluate mid-air haptics over and above the use of hand tracking alone.

This was tested by operating the interactive DOOH experiences with and without mid-air tactile effects. Users could still move their hands around on-screen and interact with the DOOH experience. However, they only received visual feedback and no haptic feedback on their hands.

A previous study had strongly suggested that mid-air haptics adds significant value to hand tracking in interactive digital signage.[10] This was validated by the pilot, which found a 23% increase in average interaction time for *The Curse of La Llorona* when haptic feedback was included (7.9 seconds versus 6.4 seconds) and a 20% increase in interaction time for *Detective Pikachu* (24 seconds versus 20 seconds).

23%
increase in interaction time for *The Curse of La Llorona* when users experienced haptic feedback

[10]See https://www.ultraleap.com/company/news/blog/boost-customer-engagement-study/

ROI analysis

Accurately calculating ROI for digital out-of-home campaigns is notoriously hard.[11] Obviously the most robust way to measure impact is actual sales uplift, but even then it can be difficult to attribute an uplift to a specific DOOH campaign.

In the ERm portion of our study, we measured the uplift in purchase intent attributable to interactive DOOH by comparing purchase intent between:

1. **The control group (only exposed to static DOOH)**
2. **The test group (exposed to interactive DOOH)**

There was a 37% increase in purchase intent within the test group for *Detective Pikachu* (63% test vs 46% control), and a 15% increase in purchase intent in the test group for *Shazam!* compared to the control group (62% test versus 54% control).

Using these figures, we can make a directional estimate of the sales uplift attributable to interactive digital signage versus static digital signage.

Uplift in purchase intent	X	Number of impressions	X	Average cinema ticket price ($9.11[12])	=	Directional estimate of sales uplift

	% who expressed purchase intent	Directional estimate of sales (if all those who expressed a purchase intent went on to buy tickets)			
		@1,000 impressions	@5,000 impressions	@10,000 impressions	@15,000 impressions
Detective Pikachu					
Control (not exposed to interactive DOOH)	46.0%	$4,191	$20,953	$41,906	$62,859
Test (exposed to interactive DOOH)	63.0%	$5,739	$28,697	$57,393	$86,090
Uplift (+36%)	**17.0%**	**$1,549**	**£7,744**	**$15,487**	**$23,231**
Shazam!					
Control (not exposed to interactive DOOH)	54.0%	$4,919	$24,597	$49,194	$73,791
Test (exposed to interactive DOOH)	62.0%	$5,648	$28,241	$56,482	$84,723
Uplift (+15%)	**8.0%**	**$729**	**$3,644**	**$7,288**	**$10,932**
Average					
Control (not exposed to interactive DOOH)	50.0%	$4,555	$22,775	$45,550	$68,325
Test (exposed to interactive DOOH)	62.5%	$5,694	$28,469	$56,938	$85,406
Uplift (+25%)	**12.5%**	**$1,139**	**$5,694**	**$11,388**	**$17,081**

Over their three-week run this equates to the following directional estimate of sales uplift for *Shazam!* and *Detective Pikachu,* attributable to interactive compared to static digital signage.

	Directional estimate of sales uplift attributable to interactive DOOH over 3-week campaign
Detective Pikachu	
Screen 1 (7,940 watchers total)	$12,297
Screen 2 (11,488 watchers total)	$17,791
***Detective Pikachu* average**	**$15,044**
Shazam!	
Screen 1 (5,742 watchers total)	$4,185
Screen 2 (13,875 watchers total)	$10,112
***Shazam!* average**	**$7,148**

~$15,000

Directional estimate of sales uplift per interactive screen over three-week *Detective Pikachu* campaign.

[11] https://www.digitalsignagetoday.com/articles/ikea-measures-dooh-effectiveness-with-russ-outdoor/?utm_source=DST&utm_medium=email&utm_campaign=EMNA&utm_content=2019-10-22.

[12] https://www.hollywoodreporter.com/news/average-price-a-movie-ticket-soars-911-2018-1178410

Conclusion

The findings from our pilot are among the first to demonstrate a clear impact on ROI for interactive digital signage compared to static digital signage.

Until now, use of digital technology in out-of-home advertising has largely been limited to the transition from paper posters to static digital displays. However, customer expectations and behaviours are constantly changing. Brands are now searching for new ways to connect and engage more effectively with customers.

Interactivity is critical in enabling dialogue and emotional engagement, and represents huge untapped potential for DOOH.

There are practical reasons why DOOH has lagged behind other channels in its implementation of interactivity. However, technological innovation means this no longer needs to be the case. Technologies such as hand and body tracking, haptics, face recognition, AI, IOT, voice UI, mobile integration and NFC all create opportunities to transform DOOH installations from static and unresponsive displays into engaging interactive experiences.

The companies who succeed in capitalizing on these opportunities will be the ones who leverage new technologies to evolve and create the next wave of the DOOH revolution.

Our pilot showed that interactivity makes digital out-of home marketing:

More addressable

- ~2x increase in conversion rate
- Up to 33% increase in dwell time

More actionable

- Up to 74% increase in attention time
- 20-30% increase in attraction ratio
- 2.25-4.8x increase in advertisement recall
- 50-60% lift in brand awareness

More attributable

- 43% lift in brand favorability
- 45% were more likely to select a movie theater with interactive digital signage
- $5,694 sales uplift per 5,000 impressions (directional estimate)

About Ultraleap

The future is a place where infinite worlds are at your fingertips. One where you interact naturally and in 3D. One where you don't need controllers.

Ultraleap was formed when Leap Motion and Ultrahaptics came together in 2019. We've united the world's most advanced hand tracking with the only haptic technology that creates the sensation of touch in mid-air.

We have a team of more than 150 spread across the world, with locations in Silicon Valley, US and Bristol, UK. Our team includes world-leading experts in interface design, acoustics, machine learning and computer vision.

The power of natural interaction. Shaped to your needs.

We offer different levels of support depending on your needs and your use-case.

Hardware and software

Groundbreaking hand tracking and virtual touch hardware, SDKs/APIs and detailed documentation.

Use-case development

Exploration, development and testing of use-cases for your application.

3D interaction design

Access to our in-house UX expertise in the unique challenges and opportunities of spatial interaction.

Design tools and custom integration support

Access to design tools and support from our engineering team in practical integration and custom hardware design.

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