

The Smartphone Effect.

How is it influencing
museum visits?



Cognitive science, memory research, and what BYOD may mean for the museum experience.

Smartphones have become an integral part of everyday life. We use them to communicate, work, navigate, learn, document experiences, and entertain ourselves, often without consciously considering how much time we spend using them.

They are also becoming an increasingly common part of cultural experiences. Many museums and cultural venues use visitors' own smartphones as interpretation tools, providing access to audio, text, video, navigation, and interactive content through Bring Your Own Device (BYOD) strategies.

But what might this mean for the way visitors experience a museum?

Research in cognitive science, memory, and museum studies has examined different aspects of smartphone use, including attention, cognitive capacity, memory formation, and how people interact with their surroundings while using a device.

The research does not provide a single answer to whether smartphones are beneficial or detrimental in every situation. However, several studies suggest that smartphone use, and in some cases simply having a smartphone nearby, can introduce additional cognitive demands and influence how people pay attention to and remember their surroundings.

This brings an important question for museums thinking about BYOD strategies

Could asking visitors to use their personal smartphones as an interpretation tool introduce distractions or cognitive demands that may work against the focused experience museums are trying to create?



The visit nobody talks about.

You walk in, scan the QR code, and try to download the app. You adjust the settings, notice that your battery is at 34%, and then an unexpected notification appears.

Suddenly, when you are standing in front of a Vermeer, your attention has shifted away from the artwork and toward your phone.

This is one possible real-world BYOD scenario, one that can happen at the door, before the visit has even started.

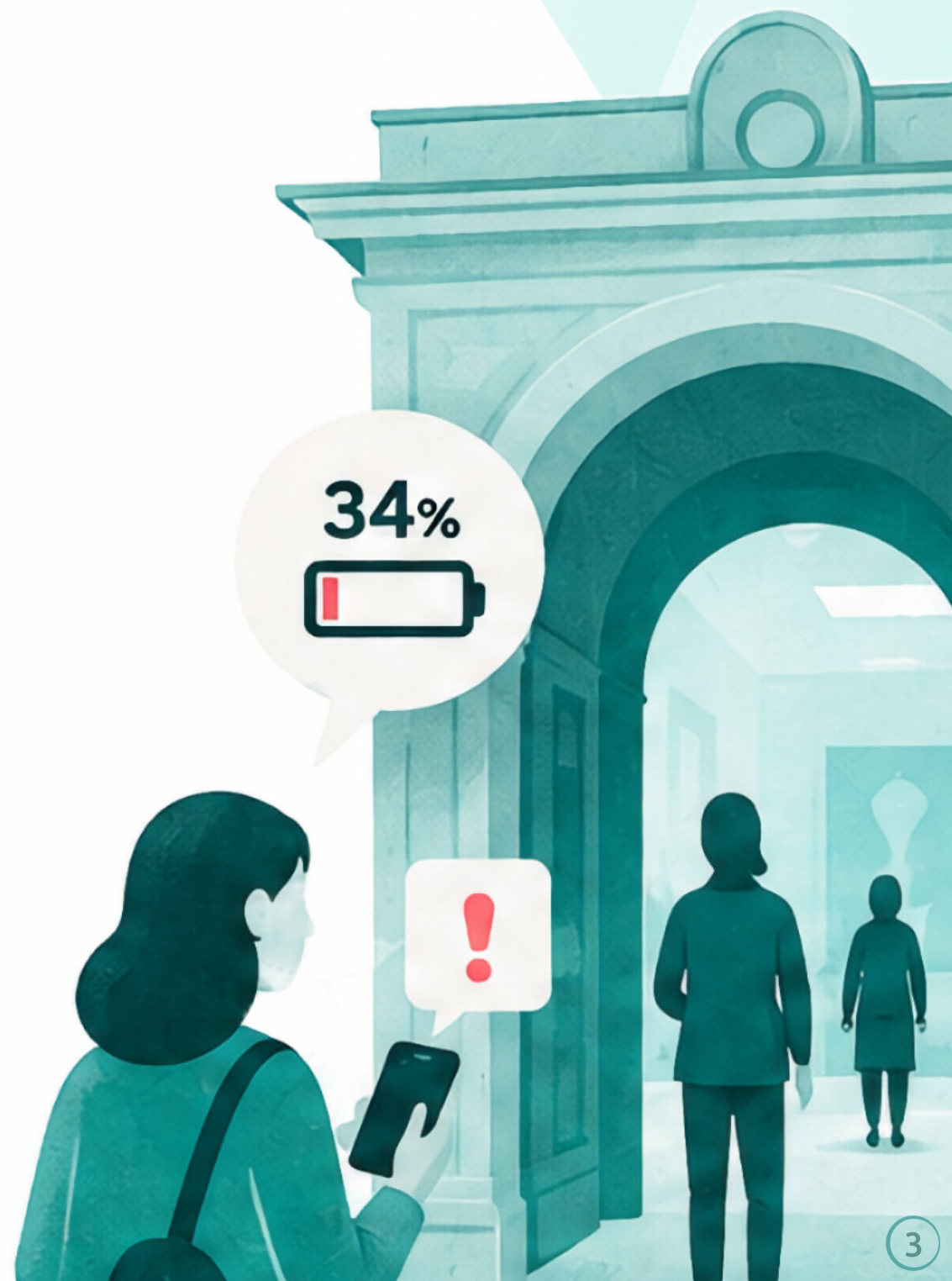
The practical challenges are easy to recognize: downloading an app, connecting to a network, managing battery life, navigating between applications, or responding to notifications. But there may also be a less visible consideration:

The cognitive role the smartphone itself plays during the visit.

To explore this further, this paper looks at three interconnected areas of research:

- ✓ Cognitive capacity
- ✓ Memory formation
- ✓ Smartphone use

Together, these studies offer different perspectives on how personal devices may influence the way visitors pay attention, process information, and remember their experiences.



Your phone may be affecting attention even when you are not looking at it.

In 2017, researchers from the University of Texas at Austin, UC San Diego, and Disney Research conducted two experiments with nearly 800 smartphone users to examine whether the mere presence of a smartphone, without actively using it or receiving notifications, could influence cognitive performance. [1]

To understand the findings, it is useful to first consider what cognitive capacity means. In simple terms, cognitive capacity refers to the mental resources available for thinking, concentrating, and processing information at a given moment.

The researchers found that participants performed differently depending on where their smartphones were located. Even when phones were turned face down on a desk or switched off, participants had lower available cognitive capacity than those who had left their phones in another room. The study also identified a linear trend: cognitive capacity tended to be lower as the phone became more visible and accessible. [1]

The researchers proposed that part of this effect could be related to the cognitive resources required to resist thinking about the device, even when participants were not consciously focused on it. [1]

One important point is that this study examined cognitive capacity under controlled experimental conditions. It does not establish that every person will experience the same effect in a museum environment. It does, however, provide an interesting perspective on the possibility that a smartphone can occupy some cognitive resources even when it is not being actively used.

For a museum visitor, this raises a question worth considering. If a personal smartphone is not only the device being used to access the interpretation, but also the device that receives messages, notifications, emails, and other information throughout the day, could its presence introduce an additional source of distraction?



Capturing more but remembering less.

Another area of research concerns what happens when visitors use smartphones to document what they see.

Linda Henkel at Fairfield University explored this question in a study in which participants were guided on a tour of an art museum. One group photographed the objects they saw, while another group simply looked at them. [2]

The results showed that participants who photographed each object as a whole remembered significantly fewer objects, fewer details about them, and fewer of their locations in the museum. Henkel described this pattern as the “photo-taking impairment effect.” [2]

"These results show how the mind's eye and the camera's eye are not the same..."

LINDA A. HENKEL, PSYCHOLOGICAL SCIENCE, 2014 [2]

The findings can be considered alongside the concept of cognitive offloading. Risko and Gilbert describe cognitive offloading as the use of physical action to change the information-processing requirements of a task and reduce cognitive demand. [3]

In simple terms, cognitive offloading occurs when we use an external tool to support a mental task that we might otherwise perform ourselves. In the context of photography, a visitor may rely on the camera to preserve an image for later, potentially changing how much attention is devoted to encoding the experience in memory at that moment.

However, Henkel's research also revealed an important nuance.

In a second experiment, participants were asked not only to photograph objects, but to zoom in and photograph specific details. In this case, the memory impairment observed in the first experiment disappeared. Participants remembered the photographed details as well as details they had not photographed. [2]

This finding suggests that the effect may not simply be about taking a photograph, but about how the visitor engages with the object while taking it.

Photographing an entire object may encourage a visitor to document the moment and move on, while photographing a specific detail may require closer observation, selection, and more deliberate engagement with what is being seen. [2]

This distinction matters when considering the role of technology in museums. Technology can potentially reduce some cognitive demands while also creating opportunities to direct attention. The effect may depend on what the technology asks visitors to do and how it fits into the wider experience.

Is it encouraging visitors to look, listen, interpret, and engage with what is in front of them? Or is it primarily helping them capture and document the experience for later?



Cognitive offloading and memory formation.

Henkel's research is part of a broader body of work examining the relationship between cognitive offloading and memory.

Grinschgl and colleagues conducted additional experiments investigating the trade-off between using external tools to support task performance and retaining information afterward.[4] Their findings suggest that cognitive offloading can improve task performance in the moment while potentially reducing the amount of information retained afterward.

This does not mean that using a device automatically leads to poorer memory. Rather, it highlights a potential trade-off: when part of a cognitive task is delegated to an external device, the way information is processed and remembered may change.

For museums, this distinction is particularly relevant. The purpose of a visit is rarely to remember every object in an exhibition. Instead, museums may hope that visitors leave with a meaningful connection to a story, an object, an idea, or an emotion.

The question is therefore not whether visitors should ever take photographs or use their smartphones. It is whether the way a device is incorporated into the visit supports the type of engagement and memory the experience is intended to encourage.

A visitor may take hundreds of photographs during a museum visit and later use them to revisit the experience. At the same time, research suggests that documenting an experience and deeply processing that experience are not necessarily the same thing.



People know they use their phones a lot, but what does that mean for museums?

Beyond controlled laboratory research, surveys provide another perspective on people's relationship with their smartphones.

In a nationally representative survey of 1,453 U.S. teenagers, 38% reported spending too much time on their smartphones, while around 44% said they felt anxious when their phone was not nearby. [5]

These findings are based on self-reported perceptions rather than behavioral measurements, and they focus specifically on teenagers. They therefore cannot be directly generalized to all museum visitors.

They do, however, illustrate how smartphones can occupy an important place in everyday life and how some users themselves perceive their relationship with the device as difficult to manage.

For museums, this raises a broader consideration.

When a visitor enters a museum, they bring their everyday digital environment with them. If their personal smartphone is then also used as the primary interpretation tool, the same device that provides access to the museum experience remains connected to messages, social media, notifications, emails, and other digital demands.

This does not necessarily mean that a BYOD strategy will negatively affect every visitor. It does suggest that museums may want to consider the potential trade-offs involved in making a personal smartphone part of the core visitor experience.



So, what does this mean for museums?

The research discussed above points toward several related considerations:

1. The presence of a smartphone may influence cognitive capacity, even when the device is not actively being used.
2. Taking photographs can influence memory formation under certain conditions, although the way a photograph is taken and how visitors engage with the object may matter.
3. People's own perceptions of smartphone use suggest that these devices can occupy a significant role in everyday life.

None of these findings, individually or collectively, demonstrates that smartphones are inherently harmful to museum experiences.

They do, however, suggest that the presence and use of personal devices can introduce cognitive and attentional considerations that may be relevant to visitor experience design.

Museums do not need visitors to have perfect recall of every object. They may instead want visitors to leave with something. A feeling, a memory, a new idea, or a connection to a story.

From this perspective, the question surrounding BYOD is not simply whether visitors can access information through their own smartphones. It is whether using a personal device as part of the interpretation supports or potentially competes with the experience the museum is trying to create.



The role of technology in the visitor experience.

Digital technology has become an important part of the way museums communicate with visitors. Screens, mobile applications, interactive interfaces, games, video, and digital interpretation can provide new ways to present information and encourage engagement.

At the same time, technology is not neutral in terms of how visitors interact with their surroundings. Different technologies require different forms of attention, interaction, and cognitive processing.

A smartphone-based experience may require visitors to look at a screen, navigate an interface, manage notifications, or switch between the interpretation and other functions on their device.

A dedicated device, by contrast, can be designed specifically around the museum experience, without necessarily requiring visitors to bring their existing digital environment into the interaction.

The research does not establish that one approach is universally better than another. Instead, it suggests that the design and context of the technology matter.

For some experiences, a screen may be the most appropriate way to communicate a story. For others, a screen-free interaction may allow visitors to receive information while keeping their visual attention on the physical environment.

The key consideration may therefore be less about choosing between technology and no technology, and more about choosing technology that supports the intended visitor experience.



A matter of attention.

Museums are environments designed to encourage observation, interpretation, curiosity, and reflection.

In a world where digital devices are increasingly present in everyday life, cultural venues have an opportunity to think carefully about how much technology they introduce into these environments, and what role it plays.

The research discussed in this paper offers several reasons to consider attention as an important part of that conversation.

If a technology requires visitors to repeatedly look away from an object, manage an interface, or resist unrelated digital distractions, those demands may become part of the experience.

If technology instead helps visitors focus on a story, understand an object, or explore an exhibition without adding unnecessary interaction, it may serve a different role.

The difference isn't necessarily between digital and non-digital. Instead, it relates to how the technology directs visitors' attention.



Less technology, more attention?

We live in a society where screens are increasingly present in everyday life. For museums and cultural venues, this creates an opportunity to reconsider not only what technology can add to an experience, but also what it might unintentionally take away.

The research reviewed here does not provide a simple answer. It does not suggest that all screen use reduces attention, that every photograph weakens memory, or that BYOD strategies are unsuitable for museums.

Instead, it suggests a more nuanced possibility:

The way visitors interact with technology can influence how they pay attention, process information, and remember what they experience.

This leads to a simple question for cultural venues:

Does this technology enhance the experience we want to create, or does it simply add another screen to a world already full of them?

The appropriate approach will depend on the goals of each venue, the needs of its visitors, and the context in which the technology is used.

What the research does suggest is that the way technology is designed and integrated matters.

Perhaps the future of digital visitor experience is not about adding more technology, but about using technology more intentionally, including knowing when less may allow visitors to pay more attention to what matters most.



Designing for attention.

How we use technology can shape how visitors experience a museum. If you are reviewing your current visitor experience, or simply exploring how to create more opportunities for attention and engagement, we would be happy to share what we have learned from working with museums and cultural venues around the world.

Explore how Guide-ID approaches screen-free audio experiences and discover what a more focused visitor experience could look like for your museum.

e-mail our
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