Can technology inspire the smartphone population to connect with the great outdoors?

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Can Technology Inspire the Smartphone Population to Connect with the Great Outdoors?

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Digital Interpretation, Technology, Outdoor Interpretation, Smartphone, Active participation, Tourism.

Abstract
This discussion paper makes observations about the use of technology in heritage interpretation and explores questions about its potential as a mechanism of engagement. We examine the following issues:

- **Quality of Information**: Internet searches return a large amount of information, but the accuracy can be problematic. Lazy research can lead to disengagement.
- **Technologies for Digital Interpretation**: We look at technologies might be suitable for delivering interpretative content in remote locations.
- **Engaging the public**: A good human guide can inspire excitement. We offer ad hoc examples of digital interaction that also seem offer excitement.
- **Project Management Challenges**: Traditional project management styles impose a task and milestone orientated approach that can stifle innovation. Complex systems project management focusses on modelling and iteration to capture project based learning. Good quality digital interpretation has more in common with rocket science than building a house!

Introduction
In an age where ‘The Internet’ is commonly cited as a source of information perhaps the first question to ask is: Is there any need for information to be packaged up and presented via any other medium other than the internet? Phrased more succinctly, is there an appetite for such information? This issue has been researched by authors such as Poria *et al* along with the implications for management of heritage sites (Poria, Biran and Reichel, 2009).
Some additional *ad hoc* evidence for such an appetite may be found by observation of the public interest in events that offer access to working archaeological digs. For example, at such an event in Leicester (Figure 1), demand for free tickets was such that an extra day had to be allowed to enable a total of 3000 visitors over two days to visit the dig. (BBC News, 2017; Buckley and Speed, 2017). Such events are regularly very oversubscribed, even though the information presented is very raw and unpolished compared to the digests seen on professionally produced television programs (Rathbone, 2017).

Other evidence has been provided to the authors by the organisers of the British Birdwatching Fair with regards to attendance at lectures (Marsh and Appleton, 2017). This event covers a huge range of environmental and wildlife interests and is, by its very nature, closely linked to the care and maintenance of outdoor habitats. The lectures and events range from celebrity talks to the results of academic research. To illustrate the level of interest from visitors we cite *verbatim* from the organisers:

> In total 15,885 lecture attendances were made Birdfair 2016 - this is the total of every lecture attendance made across all lectures over 3 days - so some people will be counted more than once.

> The range of numbers attending varied widely over each day and each lecture theatre, and competed with events in the main Events Marquee:

- LM 1 had a range from around 30 to 226 with an average audience of 99 across three days
- LM2 had a range from 34 to 196 with an average of 98 across the three days
- LM3 had a range from 9 (when a TV ‘name’ was on the main stage) to 207 with an average of 90 across the three days
- AWBC had a range of 6 (again a TV ‘name’ on the main stage) to 119 with an average of 53 across the three days.
- The Authors Forum attendance ranged from 31 to 112 with an average across the three days of 60.

(Note: LM1-3 Lecture Marquee, AWBC Anglian Water Birdwatching Centre)

We suggest that these examples illustrate a real desire in the general public to engage with history, landscape and environment including when the communication is presented in an undigested, raw format. Perhaps there is a lesson here in that engagement requires clarity of communication, without the need to worry about highly polished presentation.

**Quality of Information**

The process of researching a topic is a teachable skill. Here we are not concerned with teaching that process, instead we are concerned with the pitfalls that might befall the unwary
and result in misinformation. This may happen when a visitor tries to use curiosity driven internet searches for self-education, or much worse, when misinformation reaches formal interpretation resources, print or digital, it indicates a lack of rigour that undermines all engagement. To emphasise the need for rigor in researching interpretative material, we use here an easily replicated exercise to illustrate the potential pitfalls of using simple internet searches as an interpretive resource.

The Task

Imagine that you have been asked to provide some text for an interpretation panel for a cultivated kitchen garden. Specifically, you are asked to research some facts about a common garden bird, the Robin. In this case, we will limit the task to a single fact that might be used in an introductory text: To which family does the Robin belong?

Context

The task is on the surface straightforward, but impossible to research correctly without additional context. If our interpretation board is for an English kitchen garden (and we will now say that this is indeed the case) then we can move on to describing the trap.

The Trap

You should also know that the name ‘Robin’ is a vernacular or common name for applied to two very different species of birds of similar habit in Europe and North America. The interesting additional fact that makes the task challenging is that the American Robin is a rare but frequent vagrant the British Isles, and so is also correctly included on the lists of British Birds and many British bird books. The trap has now been primed for poor research to come up with an incorrect answer.

<table>
<thead>
<tr>
<th>Geographic Area</th>
<th>North America</th>
<th>British Isle and Europe</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vernacular Name</td>
<td>Robin</td>
<td></td>
</tr>
<tr>
<td>Family</td>
<td>Turdidae</td>
<td>Saxicolidae</td>
</tr>
<tr>
<td></td>
<td>(Thrushes)</td>
<td>(Robins, Restarts and Chats)</td>
</tr>
<tr>
<td>Scientific Name</td>
<td>Turdus migratorius</td>
<td>Erithacus rubecula</td>
</tr>
</tbody>
</table>

Table 1 Taxonomic details of the European and American Robin (Natural History Museum, 2017)

The Outcome

Table 1 lists features associated with both species of Robin. We should add that the authors have noted multiple examples of this particular research case causing confusion and invite the reader to make similar observations in the field and online.
The authoritative source of all UK species information is publicly available at the UK Natural History Museum and provides definitive up to date information on the taxonomy of all UK species.

Note that at the time of writing, the popular Wikipedia site incorrectly cites a third family Muscicapidae (Wikipedia, 2017). While we are not in a position to critique the two Wikipedia pages relevant to this hypothetical task, the existence of these variances relating to easily checked facts implies that caution should be applied all the other information presented on those pages, despite the many references that lend an air of authority to the content.

This example illustrates how:

- facts researched on the internet can be both correct and accurate in one context,
- yet are completely wrong in another context, and
- Popular online resources can be misleading.

We use this hypothetical task as an example of why all interpretive content needs to be well researched. Poor quality research does nothing to inspire the public as informed amateurs will quickly notice such issues. There are no doubt many other topics where confusion and poor engagement will result from poor quality research of facts.

Technologies for Digital Interpretation

The smartphone

A smartphone is a mobile phone with advanced features: it has WiFi connectivity, web browsing capabilities, a high-resolution touchscreen display and the ability to use apps. These features make it an attractive device for heritage interpretation. Citing some relevant findings from the UK OfCom 2015 report (Great Britain - Office of Communications, 2015).

- **Two-thirds of adults have a smartphone.** Ninety-three per cent of UK adults said they had a mobile phone in the first quarter of 2015. Of these, 71% said they had a smartphone; 66% of the adult population. This has increased by 27 percentage points since 2012.
- **For the first time, the smartphone has overtaken the laptop as the device internet users say is the most important for connecting to the internet; in 2015 33% chose their smartphone, and 30% chose their laptop, compared with 23% and 40% respectively in 2014. Furthermore, smartphones are now the most widely owned internet-enabled device (66%), on a par with laptops (65% of households).**
- **Smartphones are twice as likely to be used for watching short video clips than for full-length programmes.** Although a smartphone can allow users to access any online film or television service, users are twice as likely to use their phones to watch short-form video clips than for streaming television programmes or films (42% vs. 21%).
- **One in four mobile phone users have donated to charity by text message.** A quarter (25%) of mobile phone users have texted a donation to charity. This is more likely to be done by those aged 25-54 (30%) than by older users (15%).
A Potential Tool

These facts all support the concept of using the smartphone as a part of the heritage interpretation process, however, it should be noted that access to the smartphone is not universal, nor are the devices and their capabilities consistent. There are many types of device, at least five major operating systems (Android, Symbian, iOS, BlackBerry OS and Windows Mobile), and many personal or corporate choices relating to restrictions and device configuration.

Engaging the Public

There are many potential methods and technology that may be used within the interpretation experience, but, as indicated by the title of this paper, we shall look at how we might engage the smartphone generation using their own devices. Approaches that are based around basic webpages and downloadable can be very effective, if implemented with care to ensure compatibility with mobile devices. Indeed, formats supported by built in e-Book readers such as PDF can be very useful since they are easily produced and updated. Audio and Video can also be used with great effect, but thought should be given to any potential disturbance caused by visitors using the ‘speakerphone’ mode to play the content. Rather than explore how these well-established techniques might be adapted for smartphone use, we explore some more novel possibilities in the following subsections.

Integrate physical to web

Any printed leaflet, badge, sign, or other printed artefact can incorporate QR codes that link to web based content. This means that items on a map can have digital content associated with them and triggered by scanning the code, or inputting a short URL as an alternative. Signs can tell you about the place where you are standing, from simply locating you on a map, to an in-depth lesson on the geological, morphological, natural, and historical heritage of that spot. Not everything goes to plan. The photograph in Figure 2 shows how some interpretation boards were quickly ruined by the cows in the same field.

Figure 2 Interpretation panel with QR code ruined by livestock.

Figure 3 Discreet Interpretation. St Andrew’s Church, Epworth, Lincolnshire, UK. The church uses a discreetly placed ‘Info-Point’ Wi-Fi to provide rich media interpretation without compromising the ambiance of this important church.
Discreet Interpretation

For some venues, such as historic buildings and landscaped gardens, physical interpretation boards can be particularly obtrusive, spoiling the very thing that is the essence of the place. Yet without interpretation they may have little meaning to the visitor (See Figure 3). A proportion of visitors will have a desire for in-depth information on a specific topic. Gardeners in particular will demand information about plants - their names, habitats, propagation etc. - that is far too great to put onto labels. Collections can benefit from telling the story behind each artefact, but have little space to do this.

Virtual Reality and Augmented Reality

Virtual and Augmented reality can involve expensive equipment and high-risk leading-edge technology. However, it can be as simple as a panoramic image, stitched together from old photographs that you look at and drag-to-move with a finger on your phone and compare to the present-day view. In other words, you can incorporate a Virtual Reality or Augmented Reality (AR) experience to whatever level of sophistication that you can, given the tools that you have.

Augmented Reality can be made to work with a smartphone. You can see the real world but with something extra to ‘augment’ the view through the window of your smartphone. Imagine a Roman fort or villa where in real life all that remains is the ground plan on which you are standing. Imagine that you now hold up your phone and looking through it you see the fort or villa from the perspective of where you are standing, but seeing it as it was in its heyday, perhaps with people moving around.

The example in Figure 4 is from an inaccessible part of the site. Many people, including the authors, find matching the AR view with the real view compelling experience, especially when informative text inserts are embedded within the display.

Interactives

The underlying principle of interactives is very obvious, and easy to implement in a digital environment, but the creative possibilities lie in the ability to challenge the visitor and to respond to their needs. Interactives can create personalised experiences and can potentially create digital artefacts such as images that can later be shared via social media.

Building interactives requires some knowledge of web or app development, but these technical skills are based on common programming languages and are in good supply. Here are some basic ideas that can be run on relatively simple code, often Open Source, that can be copied and adapted to suit:
Scratch-off images

Many venues have old photographs or paintings which can be matched with modern photographs that can then be ‘scratched off’ with a finger to reveal the underlying image (see Figure 5). This can work with before and after images of restoration, reconstructions, or any kind of layered or time-series history, particularly in archaeology where aerial photography, LIDAR, and geophysics could be used. The authors have noted that many people will repeat the scratch-off process several times, especially the alignment between the images is good.

Jig-Saw Puzzles

A simple and intuitive game to assemble an image by dragging jumbled-up pieces around the screen (See Figure 6). The pieces can be made to snap to their correct positions to aid alignment, and when they are all in place some information is revealed, such as the story behind the image.

An educational game to match images with their correct name by dragging the images into the correct boxes. Subjects could be people, trees, architecture, animals, and it could be matching pictures - such as leaf and bark close-ups to a full-image of the right tree or matching pictures with names or descriptions. The boxes can be made to respond to show if they are correct or not, and the game could have a timer. You could offer small rewards to those who show a completed game with its ‘success’ screen and time.
Project Management Challenges

It is common to come across a project plan in the form of a Gantt chart or something similar to Figure 7. Such charts are useful representations of a project and when backed up with other charts showing dependencies of one task to another can be a useful management tool especially when it incorporates milestones representing the completion of critical parts of the project. When projects become complex, keeping such charts up-to-date can become laborious necessitating the use of suitable project management software. There are also methods such as PRINCE2 based around good project management practice (Great Britain. Office of Government Commerce., 2009).

Taking these comments on board, it is also common to see a ‘simple’ project plan represented by a Gantt type chart drawn using presentation software or a spreadsheet. If backed up with a good understanding of the project requirements this may be sufficient for management purposes.

Unfortunately, a good understanding of the project requirements takes a lot of practice, probably met by successfully completing similar projects. A good example would be building a house. While unexpected problems will arise, the sequence of tasks and sub-tasks will follow a natural order, (foundations are always laid before the wall can be built and so on), so the project will follow a well-defined path to completion.

When we consider a digital interpretation project there is an added complication for the project management. The technical requirements might be influenced by the creative requirements. The creative and technical requirements might both have constraints imposed by physical topography of the heritage site, which in turn impacts back on to the both the technical and creative requirements. Finally, visitors might not behave as expected necessitating additional changes. Such projects are termed ‘systems’ and are characterised by many interactions of the type we have described here.

Engineers have long recognised that delivering systems projects requires additional techniques because the interactions can have unexpected and sometimes undesirable outcomes that need to be addressed. While we are not considering something as complex as building a rocket ship, some of the techniques used in such projects, may be useful.

The System Approach

Ideally, each system component should do a discrete task and follow established standards for interoperability such that there is a choice of components, any of which can be made to work together. That way, if a component fails or is superseded, then it can be replaced with a different component with the same function and the system still works. In practical terms, this means that there should be no magic ‘black boxes’ that nobody really understands.
The systems approach anticipates complexity and allows for an iterative approach for development. This allows for interactions between creative, technical and physical requirements to be explored, often by building simple prototypes with the required functionality. Figure 8 illustrates this process. Ramos et al describes clearly the iterative testing and development approach required for the management of systems projects from the engineering perspective (Ramos, Ferreira and Barceló, 2010). This is not incompatible with the Gantt chart representation, but rather, illustrates the need for some of the tasks to be developed over a more extended time while being shaped by evaluation meetings where all the requirements and constraints are explored.

Most people trust technology far too much. Simple testing can identify things that are not going to work for you, and can reveal where assumptions have been wrong. You do not need to develop a complete installation, just something that is enough to prove the principles. If robustness over time is a concern, then trials and pilots should be undertaken before making a decision. Finding at an early stage those things that don’t work is considerably cheaper than finding them at a late stage when commitments have been made. Testing should always be practical and under realistic conditions. An on-site ‘walk through’ simulation can reveal a surprising number of snags and improvements.

**Obsolescence**

Technology is always changing. the authors like to use a ‘vegetable’ analogy for technology obsolescence. No matter how tasty they are on the day of purchase, but you would not expect vegetables bought months ago to still be edible.

Anticipating the likely rate of obsolescence of both capital equipment and software may be an important factor. This is particularly so if the equipment has to interface with other
equipment or systems that may get updated and become incompatible. Stand-alone equipment has the advantage that it will continue to do its intended job, even though it may not have all the latest functionality.

Concluding Discussion

Has this paper contributed towards answering the question posed in its title: Can Technology Inspire the Smartphone Population to Connect with the Great Outdoors? We unpicked the question and presented the following points in support of a qualified ‘yes’.

- There is an appetite amongst the general public for more detailed information than simple interpretation boards.
- The smartphone is owned by a high proportion of the population and used to support searches for information.
- Simple searches and popular sites may easily lead the unwary into false conclusions that experienced researchers will avoid through good practice. Good interpretation is built on good research.
- The smartphone can support a plethora of interactive techniques beyond simple images and text, some are more of a gimmick and other really support and engage, but which is which?
- Implementing projects which require a mix of skill sets (Engineering and Creative), technology, Visitors Smartphones, and the visitors themselves, is a complicated task. Such projects require management techniques borrowed from systems engineers, rather than the techniques user on more straightforward tasks.
References


