Scottish Heritage Partnership: Immersive Experiences

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Scottish Heritage Partnership: Immersive Experiences

How successful are the approaches to immersive technologies at major heritage sites in Scotland, in terms of outcomes against business plan expectations and in terms of visitor response?

What kinds of future development are supported by the evidence?

Immersive experiences – our working definition

- All forms of perceptual and interactive use of technologies that blur the line between the physical world and a simulated or digital world (Source)

- Experiences in which the user "feels part of the experience as a whole, encompassing all spheres of attention" (Ermi & Mäyrä, 2005):
    - **Sensory immersion (audiovisual, olfactory, haptic elements)**
    - **Challenge-based immersion (interaction)**
    - **Imaginative immersion (narrative and interpretation)**

- Experiences that are enabled by mixed/hybrid reality, through merging of real and virtual worlds to produce new environments and visualizations where physical and digital objects co-exist and interact in real time (Source)

- A mixed-mode Experience Economy (Pine & Gilmore, 1998), which reflects the nuances of differing experience dimensions embodied by different elements of a site (Suntikul & Jachna, 2016)

Immersive experiences – our working definition

Mixed-mode Experience Economy
Visitor engagement that **combines** activities across the "Four Realms of an Experience" (Pine & Gilmore, 1998)

Participation dimension
creating (active) an experience and/or
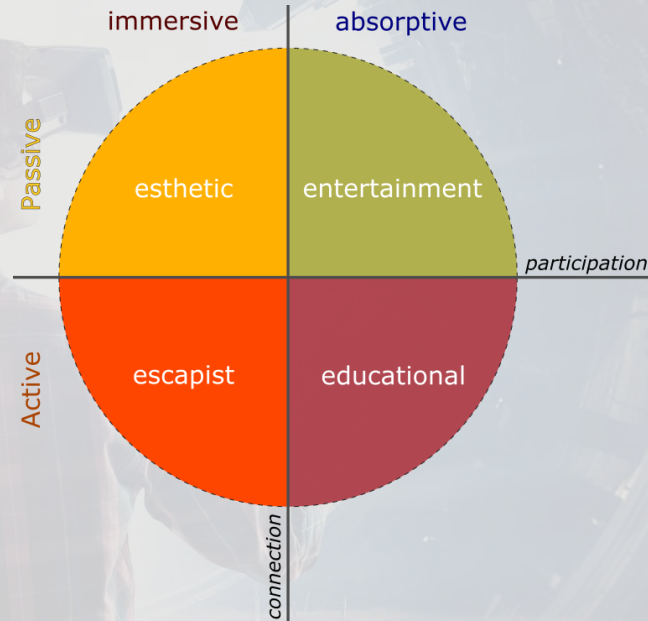*consuming (passive) an experience*

Connection dimension (environmental relationship)
engaging the mind (absorptive) and/or
bodily/virtually engaging the being (immersive)

➕

Perceptual and interactive technologies
Varying degrees of adoption and use, ranging from high- to low-tech

immersive   absorptive

Passive

esthetic   entertainment

participation

Active

escapist   educational

connection

Adapted from Pine & Gilmore (1998)

Immersive experiences – pillars

- The three pillars of immersive experiences are visual quality, sound quality, and intuitive interactions. Full immersion can only be achieved by simultaneously focusing on the broader dimensions of these pillars (Source: Qualcomm)
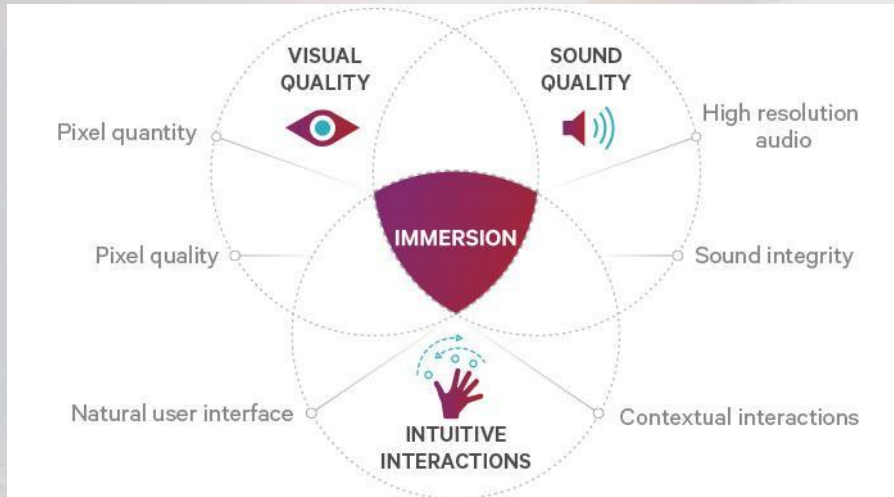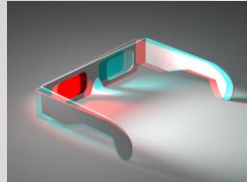
Immersive experiences – perceptual types

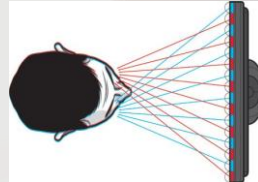- 3D (stereoscopic)

handheld	Anaglyph and polarised 3D glasses	Autostereoscopy (e.g. Nintendo 3DS)

- 4D

Combination of 3D (stereoscopic) synchronized with physical effects and sensory inputs, e.g. olfactory effects; vibration; sprayed water

Immersive experiences – perceptual types

- Fulldome
  One or more video projections onto a dome create an immersive experience to viewers within the dome.

- Holography
  A hologram is a photographic recording of a light field, rather than of an image formed by a lens. It is used to display a 3D object which can be seen with the naked eye.

Immersive experiences – perceptual types

- Virtual Reality (VR)
  creates a digital simulated world that the user is fully immersed in from a visual perspective, generally through a Virtual Reality headset (e.g. Oculus Rift, Sony PS Morpheus, HTC Vive, Google Cardboard, Samsung Gear VR)

- Augmented Reality (AR)
  blends virtual reality with the physical world. A user can see and interact with virtual objects in the real world with a special headset (e.g. Microsoft HoloLens, CastAR, Google Glass

Immersive experiences – perceptual types

- 3D audio and surround sound
  manipulate the sound a person can hear by placing and controlling the sound created from speakers places in various locations around the listener(e.g. in front, on top, behind and on the sides of the listener). Surround sound is an advanced version of 3D audio where sound is recorded and played through multiple audio channels from multiple speakers that surround the listener.

- Haptic technologies
  apply forces or vibrations to the user which create the sense of touch

Immersive experiences – interactive types

While the perceptive technologies provide input to the user, interactive technologies recognize the various outputs a user provides and respond to it accordingly

- Speech recognition technology (e.g. Siri, Amazon Alexa, Google Home)

- Motion gesture solutions (e.g. Playstation Move, Xbox Kinect)

- Omni-directional treadmills (that allow a user to move in multiple directions within a virtual reality)

- Brain-Computer Interface technologies, which provide a direct communication pathway between an enhanced or wired brain and an external device
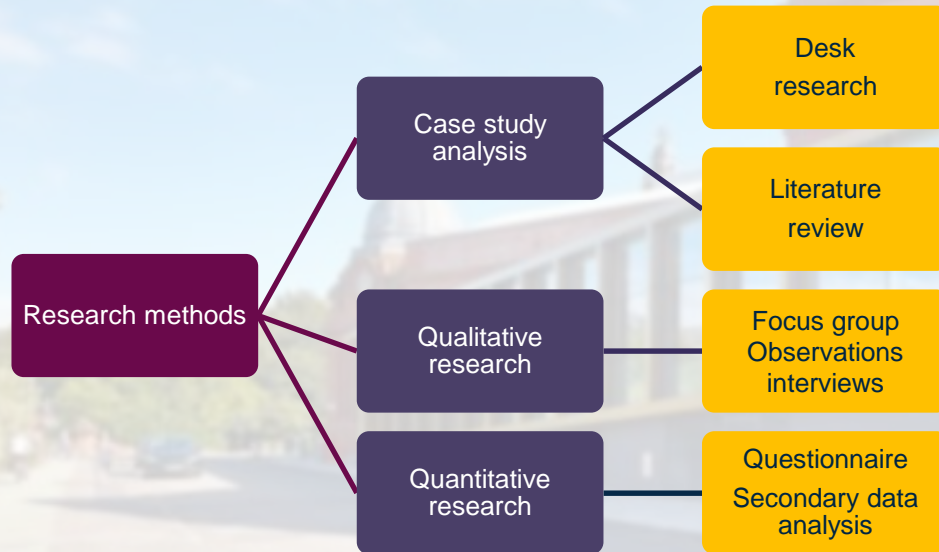
(Source)

Objectives

- Address the efficacy, existing practice and future potential of immersive experiences and technologies in the cultural heritage industry

- Explore how to best harness and shape cutting-edge digital technology

- Assess how to develop effective, meaningful content into leading edge inclusive and impactful immersive experiences

- Produce an evidence-based, decision-making and risk assessment model and visualisation for developing immersive technologies in the CH sector

Project outputs

- Decision-making and risk-assessment tool
  - VR/AR routes to market and effectiveness based on collected evidence
  - Visualisation by Soluis Heritage

- Website and social media presence

- Conference and journal papers

- Presentations and datasets

Methodology

Research methods

- Case study analysis
  - Desk research
  - Literature review
- Qualitative research
  - Focus group Observations interviews
- Quantitative research
  - Questionnaire Secondary data analysis

Case study analysis

- Case study analysis of five Scottish heritage sites:
  - **Battle of Bannockburn**
  - **Culloden Battlefield**
  - **Robert Burns Birthplace Museum**
  - **Riverside Museum**
 - **National Library of Scotland at Kelvin Hall**
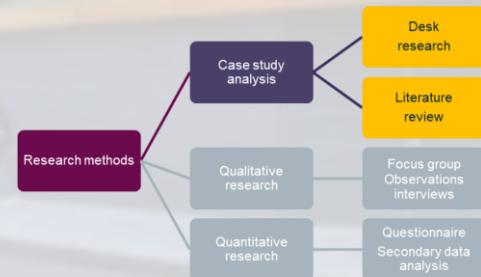
Case study analysis - Desk research

- Visitor data collected from PEN and NTS studied

- Identification of issues and gaps in current research

- Juxtaposition with visitor comments on social media (TripAdvisor)

- Definition of themes for further exploration
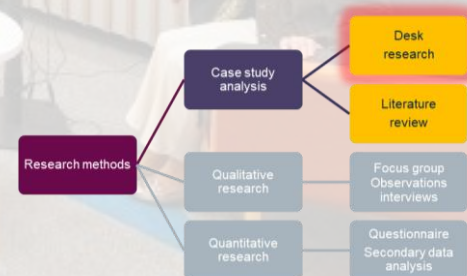
# Case study analysis – Literature review

- Evaluative report of relevant literature (scholarly, professional, and project deliverables)

- Focus on five areas:

  - Usability evaluation

  - Interpretive approaches

  - VR/I as a learning platform

  - VR/I experiences in Education

  - VR/I experiences in Marketing
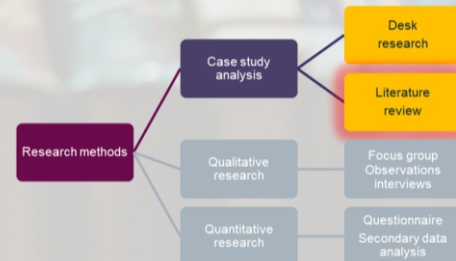
Qualitative research – Focus groups, observations, interviews

- **Focus group** organised at:
  Newhailes, National Trust for Scotland

- **Observations** of VR/I experiences' users across the five sites

- **Interviews** with VR/I users (on-site), stakeholders,
  and decision-makers
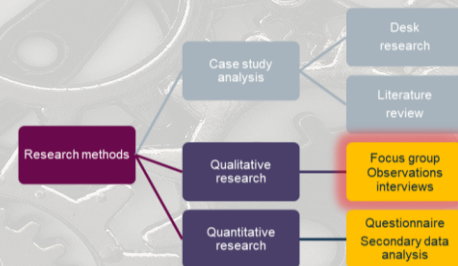
Quantitative research – Questionnaire

- Questionnaire forms available on-site at VR/I experiences across the five sites

- Questions seek to address:

  o **Current gaps and issues identified via desk research**

  o **The five focus areas identified via the literature review**
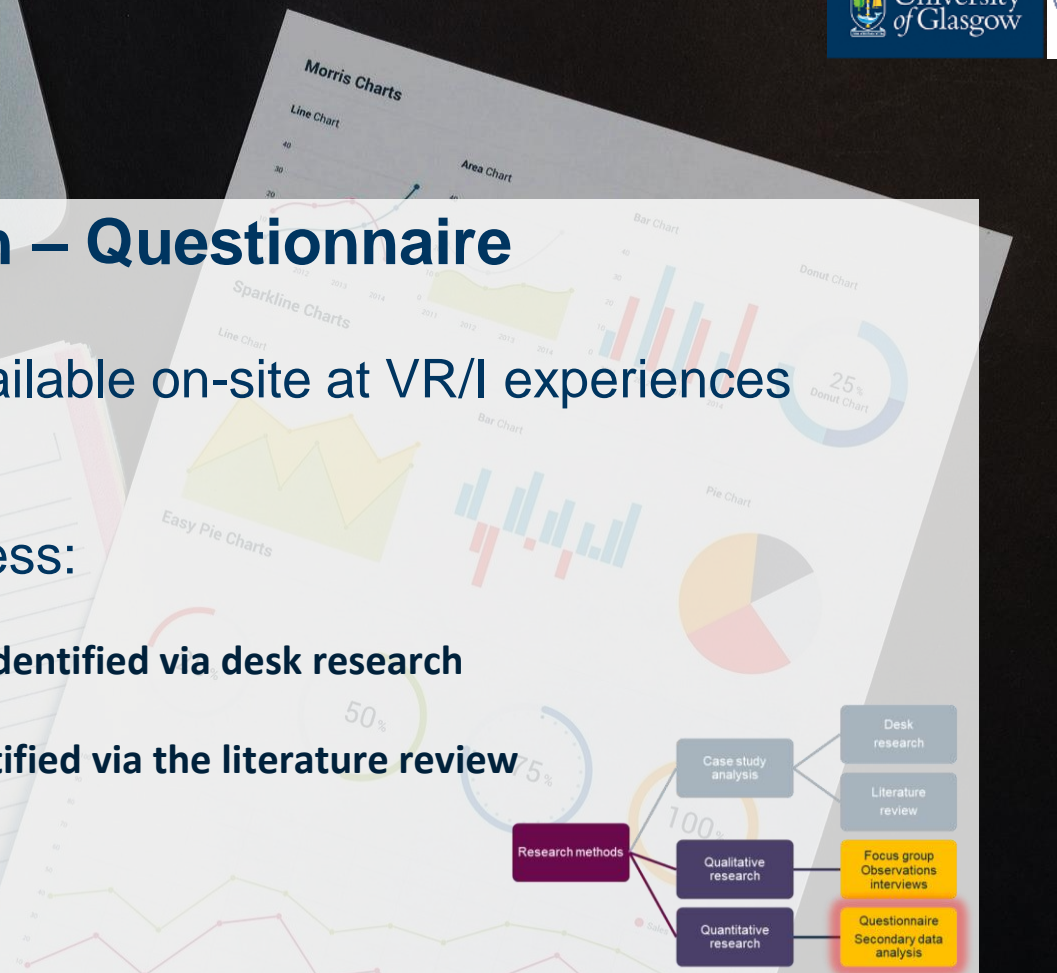
Quantitative research – Questionnaire

- Questionnaire structure:

  - **Project description**
    The nature of the Scottish Heritage Partnership project, and the reason why we ask visitors to complete the questionnaire.

  About the visit
  Purpose of visit; repeat/first-time visit; sole visitor or group

  Using the immersive experience
  Satisfaction and enjoyment, perceived level of engagement, evaluation of usability and interpretive methods, time spent, perceived suitability of experience for different age groups

  About the visitor (demographics)
  Age, gender, education level, nationality, disability

Questions deriving from desk research

Questions deriving from lit. review

Questions deriving from desk research

Desk research - initial findings

Bannockburn

- ⅓ of visitors keep coming back, almost half of them with children

- Only 26% liked audio guides – *why; was it just the cost?*

- 33% complained about guided tours and re-enactments – *reasons?*

- "Less gimmicks in favour of content" - more context and more of educational material, *not just entertainment?*
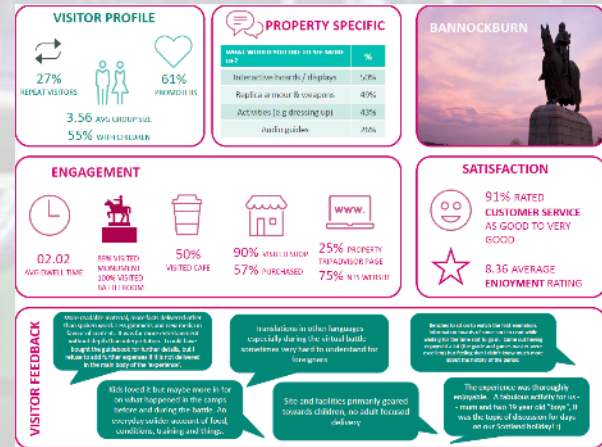
Desk research - initial findings

Bannockburn – TripAdvisor comments

The 3D experience is well done, but some of the interactive items did not work. The battle room was great fun and worth joining in for a laugh.

Visit the hill outside with a structure with absolutely no information and nothing other than view toward the castle and Schiehallion.. No static displays and nothing to see. Won't go back and wouldn't recommend

This is accurately described as an experience, not a museum. The tour involves some animated videos telling you the story/context of the battle, then an interactive game where you get to control the battle yourself! This game is fun, the guide was very enthusiastic and knew all the details of how the battle actually happened.

Kids are able to try on various battle costumes, hold weapons and learn all about the history in a fun interesting way. There is a 3D 3 wall battle field where you are in the line of fire, superb. You can then take part in your own battle to see who wins.

The Battle of Bannockburn Experience is a fantastic place to visit. You discover the entire story of the battle in 3D with 3 huge video walls surrounding you. You can then continue to the battle room and try out your own stratergies to see if you can win the battle for yourself. The only problem is that there are English & Scottish people on screens that you wave your hand in front of to choose the next story and this doesn't work very well, otherwise the whole experience is amazing.

Desk research - initial findings

Culloden

- Only 22% repeated visitors, 20% with children - *why?*

- Majority of visitors spent visit walking around the site – *incentives to visit experience?*

- "Make it more interactive for children of all ages" *engagement for children and adolescents?*

- Complaints about guided tours/re-enactments: 24% better labelling; 21% request for guided tour; 18% more for children – *reasons?*
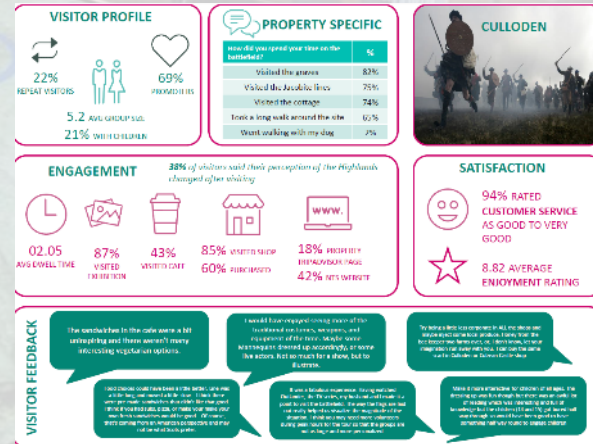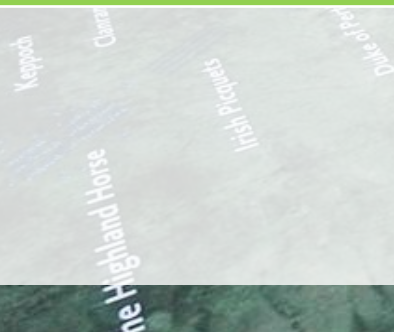
Desk research - initial findings

Culloden – TripAdvisor comments

The visitor centre is well worth the entrance fee giving a fantastic account of both sides of the battle and the events and politics leading up to it. The battle experience being in the middle of the action is very well done.

As you walk the battlefield there are a few signs dotted here and there explaining the position of the armies (see pic) which are interesting and really important to explain why these areas on the field mattered, but the trunk boxes placed here and there with no information except a number leave lots of questions unanswered. I did enjoy the recreation of the hut

Desk research - initial findings

Robert Burns Museum

- Guided tour rated highly –
  how does this compare to other sites?

- Complaints around interpretation, 23% requested clearer information –
  how do digital technologies affect information and interpretation?

- Combination of a variety of immersive elements with objects –
  How well do the immersive elements support interaction between (virtual) environment, real visitors, as well as engagement with the objects
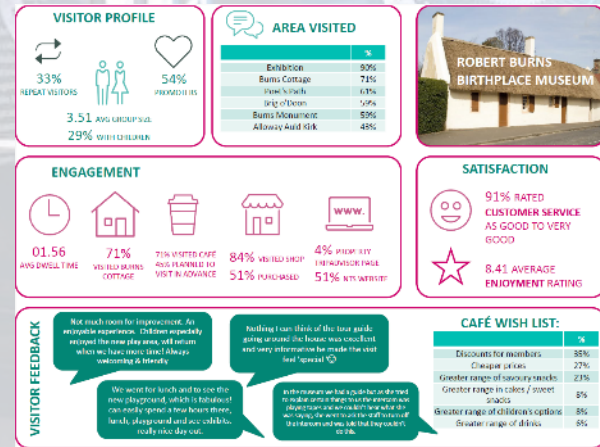
Desk research - initial findings

Robert Burns Museum

there are interactive bits in the museum that the kids can use

The part of the museum that we saw is beautifully designed and has a wonderful trove of original documents, as well as a collection of recorded Robert Burns songs.

the original documents on display are in very dimly lit cases with glass enclosures that keep you pretty far from them, so unless you have extraordinary eyesight, you can't actually read them. And there are no transcriptions to help.

Desk research - initial findings

Themes for further exploration

- How would site and facilities be geared towards adults / towards children?

- What else would you like to have seen?

- Approximately how long have you spent using/engaging with the immersive experience?

- How easy was it to understand the use of each feature of the immersive experience?

Desk research - initial findings

Themes for further exploration

- What made the immersive experience easy to understand?

- What made the immersive experience difficult to understand?

- If you were describing this experience to a friend, which three words would you use?

- What, if anything, do you find particularly attractive or appealing about this immersive experience?

- What did you not like about the immersive experience?

Desk research - initial findings

Themes for further exploration

- How do immersive technologies and experiences contribute to Scottish tourism?

- Can immersive technologies influence decisions to visit Scottish cultural heritage sites?

Table B1: Most Visited Attractions in Scotland, 2017

Paid Attractions		Free Attractions	
Attraction	Visitor Numbers	Attraction	Visitor Numbers
1 Edinburgh Castle	2,063,709	1 National Museum of Scotland	2,165,601
2 Edinburgh Bus Tours	690,082	2 Scottish National Gallery	1,600,761
3 Stirling Castle	567,259	3 Riverside Museum	1,355,359
4 Edinburgh Zoo	519,281	4 Kelvingrove Art Gallery & Museum	1,304,072
5 Urquhart Castle	488,136	5 St Giles' Cathedral	1,285,654
6 Glasgow Science Centre	425,961	6 Royal Botanic Garden Edinburgh	821,955
7 Glenfinnan Monument	396,448	7 Gretna Green Famous Blacksmith's Shop	812,177
8 Royal Yacht Britannia	390,482	8 National War Museum	764,079
9 The Scotch Whisky Experience	376,757	9 Regimental Museum of the Royal Scots Dragoon Guards	745,208
10 Loch Ness by Jacobite	298,000	10 Gallery of Modern Art	670,555

Source: Moffat Centre (2018), Scottish Visitor Attraction Monitor 2017

TOURISM CONTRIBUTES **AROUND £6BN** OF GDP TO THE SCOTTISH ECONOMY, 5% OF THE TOTAL

EACH ADDITIONAL £100 MILLION SPENT BY TOURISTS **SUPPORTS AROUND £65 MILLION OF GDP** IN THE WIDER ECONOMY

TOURISM EMPLOYS 207,000 PEOPLE, AROUND ONE IN 12 JOBS IN THE ECONOMY

TOURISM EMPLOYMENT **HAS GROWN 12%** SINCE 2011, CREATING AN EXTRA 20,000 JOBS

Source: Scottish Government, 2018

Literature review - initial findings

Usability evaluation

- "the extent to which a product can be used by specific users to achieve specified goals with effectiveness, efficiency and satisfaction in a specific context of use" (ISO 9241-11,1998, p. 2)

  o **Effectiveness: the ability of users to complete tasks using the system, and the quality of the output of those tasks**

  o **Efficiency: the amount of effort expended in performing tasks**

  o **Satisfaction: Users' subjective reactions to using the system**

Literature review - initial findings

Usability evaluation

- **Ease of use** - how easy is the immersive technology to use? Is it intuitive? Is it easily usable by all relevant audiences, with different level of skill and experience?

- **Ease of learning** - how easy is it to learn how to use?

Source: EMOTIVE D9.1 –Evaluation Framework and Guidelines

Literature review - initial findings

Usability evaluation – considerations for decision-making

- What dimensions of evaluation have been considered in prototyping/designing immersive experiences?

- Consideration and implementation of principles in Bannockburn, Culloden, Robert Burns
  E.g. Bannockburn: "[…] some of the interactive items did not work" – how did it affect satisfaction? What issues with effectiveness and efficiency can be identified? How do these align with site's objectives regarding the creation of immersive experiences?

- Are evaluation objectives reflecting dimensions included in planning, strategy?

Literature review - initial findings

Usability evaluation – considerations for decision-making

- Taking into account user experience parameters (EMOTIVE, 2017):

  o **affective (motivational, emotional) response, and whether the user feels stimulated, engaged or fatigued and bored**

  o **immersion (in the sense of suspending disbelief and supporting the feeling of presence in the experience)**

  o **cognitive or conceptual change, or even pedagogical value, as a result of the user's creative encounter with the system being evaluated**

  o **perception of value - whether the system is important to the users and what is its value for them aspirational - whether the system inspires the user, whether it delivers 'wow' experiences**

Literature review - initial findings

Interpretive approaches

- "Despite offering tools for personalization and even when they adopt storytelling approaches, virtual museums have largely followed the wider tendency in the cultural heritage sector to **use narrative narrowly**, as a method to communicate to the public the findings and research conducted by the domain experts of a cultural site or collection." (Perry et al., 2017)

Literature review - initial findings

Interpretive approaches

- "personal experiences lead [heritage sites] to be more lastingly remembered, restorative and sometimes transformative" (Perry et al., 2017) **but**

- **"**even when developed, they are usually directed at sites from recent or historic times which have relatively robust material and ethnographic data to support them. This is critical because many heritage sites have few remnants that are either visible or relatable to the broad public. As such, they may not have **enough resonance to engage visitors on their own or through standard interpretational means**. […] Intangible heritage, by its very name, is also often elusive or abstract, hence difficult to pin down in typical museological fashion." (Perry et al. 2017)

Literature review - initial findings

Interpretive approaches

- Recommendations from EMOTIVE Evaluation Framework (2017):

  - adopt a **story-based rather than an object-based approach**, supporting interaction between (virtual) characters as well as real visitors, as well as engagement with the objects;

  - **blend the online with the on-site** experience;

  - seamlessly **integrate the pre-, during, and post-visit activities**, and the intangible with the tangible;

  - cater to the dominant visiting patterns of museums and cultural heritage sites, which primarily see groups of visitors participating in social experiences with varying - sometimes conflicting - individual motivations;

  - integrate **exploration of hybrid 2D/3D** spaces in meaningful ways which support the storytelling and the social and emotionally-engaging experience of the visit

Literature review - initial findings

Interpretive approaches – considerations for decision-making

- Is immersion without personalisation possible?

- How do the experiences, biases and socio-cultural backgrounds of domain experts translate into and affect immersive user experience? Can the user fully relate to the content, if we accept that VR technologies "create an environment within which the users can completely immerse themselves, having the impression that they have 'stepped inside' the artificially created world"(Economou and Pujol-Tost, 2011)?

Literature review - initial findings

Interpretive approaches – considerations for decision-making

- Incorporating EMOTIVE recommendations into a decision-making model:

  - **Story-based approach**

  - **Seamless integration of tangible and intangible; pre-, during, post- activities**

  - **Support for story-telling via technology and immersion**

- What risks can these approaches entail?

Literature review - initial findings

VR/I as a learning platform in heritage settings

- Reasons to include VR in CH settings:

  - commercial pressures;

  - the capacity to transcend the physical space of the exhibition with their potential for virtual reconstructions; and

  - their ability to support the educational role of the museum.

- Some negative aspects have also been evidenced:

  - problems of integration with the rest of exhibits,

  - obstruction of learning by non-intuitive interfaces, and

  - limitation of social interaction due to the one-to-one communication paradigm of these applications.

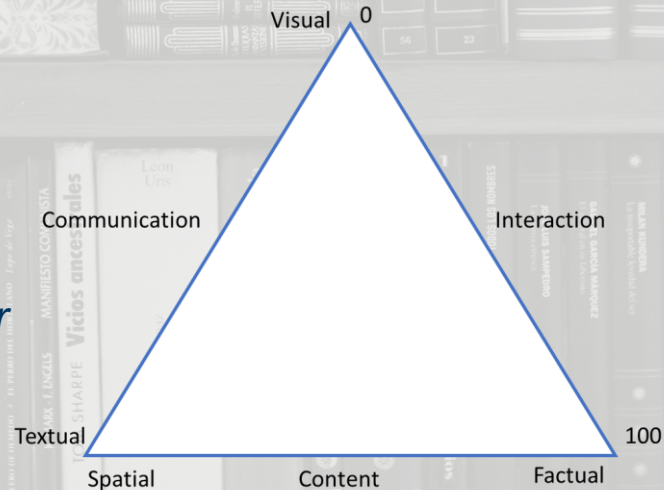(Economou and Pujol-Tost, 2011)

Literature review - initial findings

VR/I as a learning platform in heritage settings

- Case studies reviewed by Economou and Pujol-Tost (2011) on immersion, perception and use of different kinds of ICT exhibits showed that:

  - factors attributed by visitors to the suitability of the technologies for learning included richness of information (multimedia); quality of reconstruction (VR); and link with previous knowledge

  - these factors would have no effect on learning if the interface and the organization of the content were not intuitive

  - immersive devices do not guarantee an immediate acquisition of knowledge or positive attitude towards the experience

  - needs to be as multi- sensorial and natural as possible, because otherwise the understanding of the content is compromised

  - there can only be understanding or learning when all problems related with the interface design are previously solved

Literature review - initial findings

VR/I as a learning platform – considerations for decision-making

- Is learning considered in the design (and incorporated into planning and implementation) of VR/Is?

- What factors influencing suitability of VR/Is for learning?

- *How do these factors relate to broader theory about digital media capabilities and digital community definition?*

Source: Economou and Pujol-Tost, 2011, p. 170

Literature review - initial findings

VR/I as a learning platform – considerations for decision-making

- Digital media capabilities:

  - **Interactivity**
    A medium's capacity to let people talk and interact with each other

  - **Temporal Structure**
    Engaging in real time, synchronously and/or asynchronously

  - **Social Cues**
    context, meaning, identity

  - **Storage**
    Recording an interaction

  - **Replicability**
    Replicate, edit, or re-send an interaction

  - **Reach**
    The audience that the medium can address

  - **Mobility**
    Ubiquitous access, from anywhere and anytime, regardless of location

  (Baym, 2015)

Literature review - initial findings

VR/I as a learning platform – considerations for decision-making

- Defining digital communities:

  - **Space**
    Digital spaces on a spectrum of metaphorical to physical - from interactive worlds, to voice servers, and eventually text chat only

  - **Practice**
    Habitual and unconscious practices, especially language (but also including virtual practice, like a how you play your in-game character). Insider shared practices, norms and shared behaviours

  - **Shared Resources and Support**
    Feeling part of a group with shared interests and participating in gathering/sharing information, knowledge and experiences

  - **Shared Identity**
    Personalities and roles that define the activity and the experience

    (Baym, 2015)

Literature review - initial findings

Education and marketing

• Connections between immersive environments/experiences and education have been explored in both scholarly research and professional publications
e.g. Alahuhta *et al.,* 2014; Dalgarno and Lee, 2010; Gardner & Elliot, 2014; de Freitas, 2008; Elliott, 2013; Schrader, 2008

• Marketing has targeted VR/I technologies and experiences under the moniker of "experiential marketing". The key features of experiential marketing:

  • **Participation and live interaction –** invite audience involvement

  • **Creativity and innovation –** identify ways of making experiences memorable, unique and distinctive

  • **Adoption of digital applications –** utilise creative digital applications as a way of capturing leads, or creating immersive experiences.

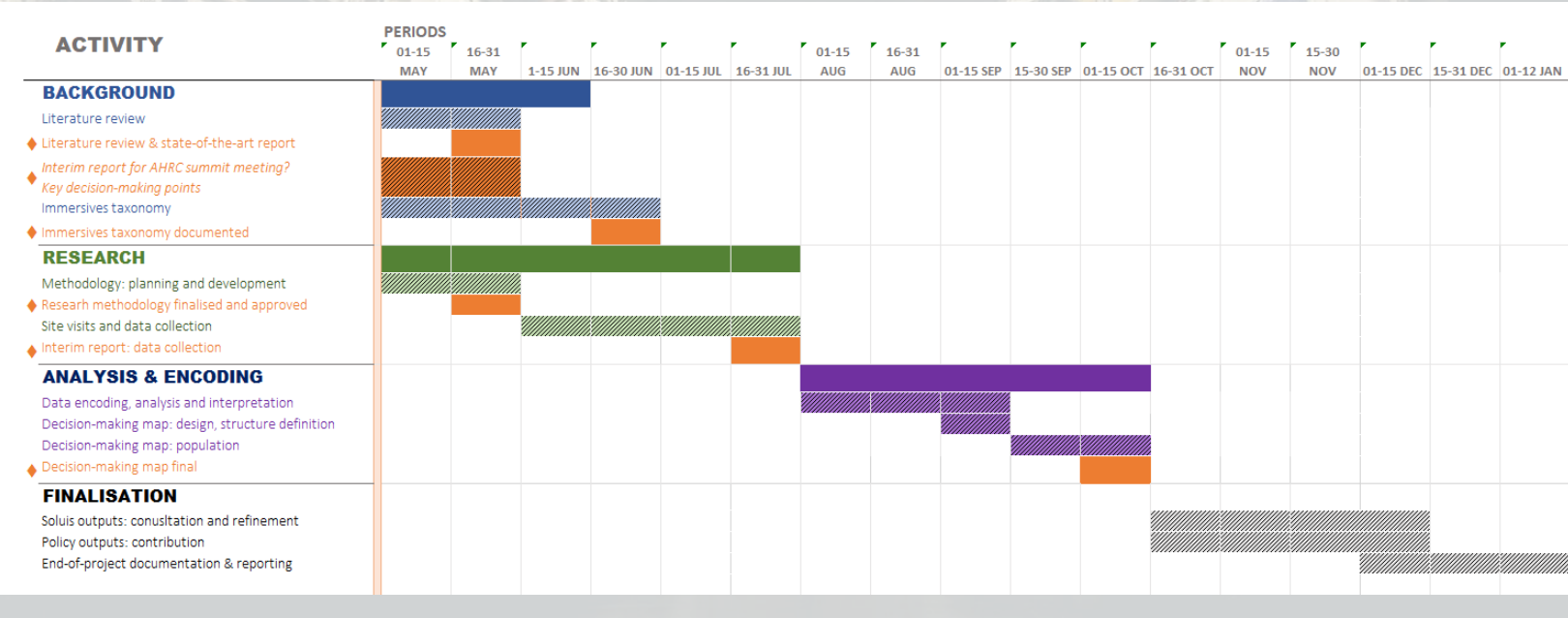# Literature review - initial findings

Education and marketing

- The Event Marketing Institute and experiential agency Mosaic publish an annual survey on experiential marketing research, which provides insights into the effectiveness of experiential marketing. Some findings in the 2016 edition (EMI & Mosaic, 2016):

  - **74% of event attendees say that they have a more positive opinion about the company, brand, product or service being promoted after the event.**

  - **70% of users become regular customers after an experiential marketing event.**

  - **About 34% of consumers surveyed said they would make a post about an experience on their social media pages.**

  - **98% of users feel more inclined to purchase after attending an immersive activation.**

Literature review - initial findings

Education and marketing – considerations for decision-making

- How can education and marketing research in immersive technologies inform decision-making for the CH sector?

- Heavy investment in research on implementation of VR/I in both education and marketing domains -- highly formalised in both. **Can this work in a similar fashion in the informal environment of cultural heritage sites**?