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The Great Bath at Bath lies at the heart of the best surviving suite of Roman Baths in Britain. It is animated by the city's unique thermal water which rises in an adjacent bath and which today still flows through the same channels, baths, and drains designed for it by the Romans in the first century AD. With the sixteenth century Abbey Church rising in the background, this is one of the most spectacular urban landscapes in Britain. Today the hot springs remain the life-blood of the city, with the Roman Baths the engine that drives the sub-regional tourism economy.

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Foreword

The cultural heritage sector is facing important challenges in pursuing and sustaining its fundamental mission of protecting and preserving historic and culturally important buildings, monuments, and museums. There is an almost universal scarcity of funds for investing in cultural heritage sites. Major funding sources, such as public-sector funding bodies, have many competing demands on their budgets. In the public sector, funding bodies constantly question why extra funds should be directed at cultural heritage instead of additional funds for ‘vote-winning’ sectors such as education or health. There is a perception that heritage is a luxury compared with dealing with issues such as education, health, employment and defence.

Heritage is often highly valued in cultural and social terms but policy makers increasingly seek justification for allocating incremental funds on the basis of perceived socio-economic benefits. Here lies a fundamental problem for heritage – the costs of heritage are highly visible in the budgets of government funding, but the benefits are less visible, often intangible and difficult to capture in conventional terms. In the policy-making arena, where decisions concerning the allocation of funds take place, cultural heritage organisations are often ill-equipped to forward a socio-economic case for investment. Cultural heritage could be considered as an emerging, and potentially significant, industry in its own right, but attempts to evaluate and measure its socio-economic contribution are relatively under-developed.

Most cultural heritage sites have not systematically developed tried-and-tested techniques or processes to evaluate their socio-economic contribution. Such sites often find themselves receiving excellent rhetorical support from policy makers and public bodies for their vital role in preservation and protection, but still struggle to attract incremental financial support that would ensure the sustainability of many cultural heritage sites. There is little doubt that the profile of heritage as a potentially important driver of socio-economic benefits to communities has been increasing but the tools, methodologies, and capabilities for evaluating the socio-economic contribution are in their relative infancy.

It is apparent that cultural heritage can have an impact at many levels, including economic, social, cultural, educational, and environmental. These different impacts require different methodologies and capabilities for evaluation. Priority impact evaluation areas may vary from site to site, depending on a number of factors such as stakeholder expectations, policy and funding contexts, and the underlying mission of the site.

The *Heritage management* series is a resource for the heritage community supported by the European Commission’s EPOCH Network of Excellence, the CUBIST Research Group, and Brighton Business School. This volume provides examples and case studies of how heritage can be used to increase positive impact on both society and the economy. It is hoped that the multi-disciplinary approaches considered here will stimulate discussion and produce interesting exchanges of learning and hopefully a mutual appreciation of the contribution made by different disciplines to the development of the cultural heritage sector.

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1 Assessing the socio-economic impact of heritage: From theory to practice

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This chapter forwards a socio-economic impact model which conceptualises holistically the key dimensions and complex dynamic inter-linkages that drive impact and combines this with a typology of impacts and accompanying measurement considerations. This theoretical construction is converted into a practical tool for assessing and measuring impact through the new 6Cs HIT (Heritage Impact Training) model, which is designed to help heritage managers, strategists and policy makers implement coherent and effective approaches to capturing the socio-economic impacts of heritage.

1.1 Introduction

This chapter forwards a socio-economic impact model which conceptualises holistically the key dimensions and complex dynamic inter-linkages that drive impact and combines this with a typology of impacts and accompanying measurement considerations. This theoretical construction is converted into a practical tool for assessing and measuring impact through the new 6Cs HIT (Heritage Impact Training) model, which is designed to help heritage managers, strategists and policy makers implement coherent and effective approaches to capturing the socio-economic impacts of heritage.

Using the 6Cs Heritage Impact Training (HIT) model a heritage site manager can progress through six predefined stages ranging from conceptualising the site to measuring the impact, and changing the business process and strategies. The aim of the 6Cs HIT impact training tool is to allow heritage site managers, directors and trustees to develop an understanding of social and economic impact assessment. It is a process for collecting data and using that data to communicate a site's social and economic value, as opposed to simply writing anecdotal narratives. The 6Cs HIT model will allow managers to develop capabilities in:

- Conceptualising how different factors contribute to the social and economic impact of a heritage site.
- Strategic thinking: Allowing sites to build strategic management capability for understanding changing impacts.
- Identifying the link between a heritage site's social and economic impact and its day-to-day operations.
- Performance measurement: Why, what, on whom, for whom and prioritise which impacts to measure depending on the organisation, etc.

Assessing impact at heritage sites can lead to improvements in internal performance, and in the long-term improvements in overall performance in the heritage sector. Importantly, the value of such a tool increases in importance with smaller, resource-poor heritage sites and organisations that do not have access to extensive business knowledge and human resources to undertake socio-economic analyses. Research by workpackage 2.6 and across EPOCH makes it clear that the potential for heritage institutions to make use of advanced information and communication technology (ICT) is limited by such contextual factors as the availability of budget, staff, collections and users (Arnold and Geser 2007: 81–83, Geser 2004).

Diverting staff resources from core business processes to conduct impact assessment is a decision that is not undertaken lightly. However, the new model and training tool does more than simply provide

an impact measure – it highlights the links between strategy, business process and impacts/outcomes. Therefore, time spent on the training yields two results: An impact assessment and an understanding of how the strategy and operations at a site can be modified to improve impact.

1.2 The 6Cs Heritage Impact Training Model

The Heritage Impact Training (HIT) model is a conceptual model and training course aimed at managers, directors and trustees of museums and heritage sites. Its objective is to help these organisations to identify where and how they generate socio-economic impacts and value.

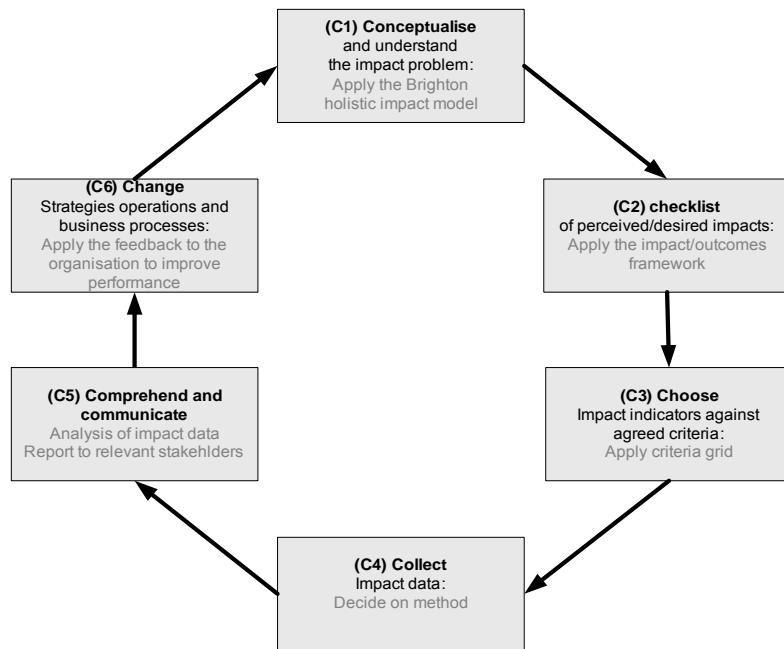


Figure 1: The 6Cs Heritage Impact Training (HIT) model conceptual framework.

It is composed of six elements (the six Cs):

- *C1 – Conceptualise* and understand the impact problem
- *C2 – Checklist*: Construct and draw up list of desired/perceived impact measures
- *C3 – Choose* impact indicators against agreed criteria
- *C4 – Collect* the data
- *C5 – Comprehend* and communicate by analysing the impact data and report the results to the appropriate stakeholders
- *C6 – Change*: Improve performance and impact.

1.3 Conceptualise and understand (C1)

Conceptualise and understand the impact problem. The aim of this step is for managers to gain an understanding of the basics of impact at their site. Questions such as what is meant by impact, why study impact and what drives impact need to be considered.

Tools

- Apply the holistic impact model to understand impact, the impact problem and drivers.
- Select and apply established management tools to aid analysis.

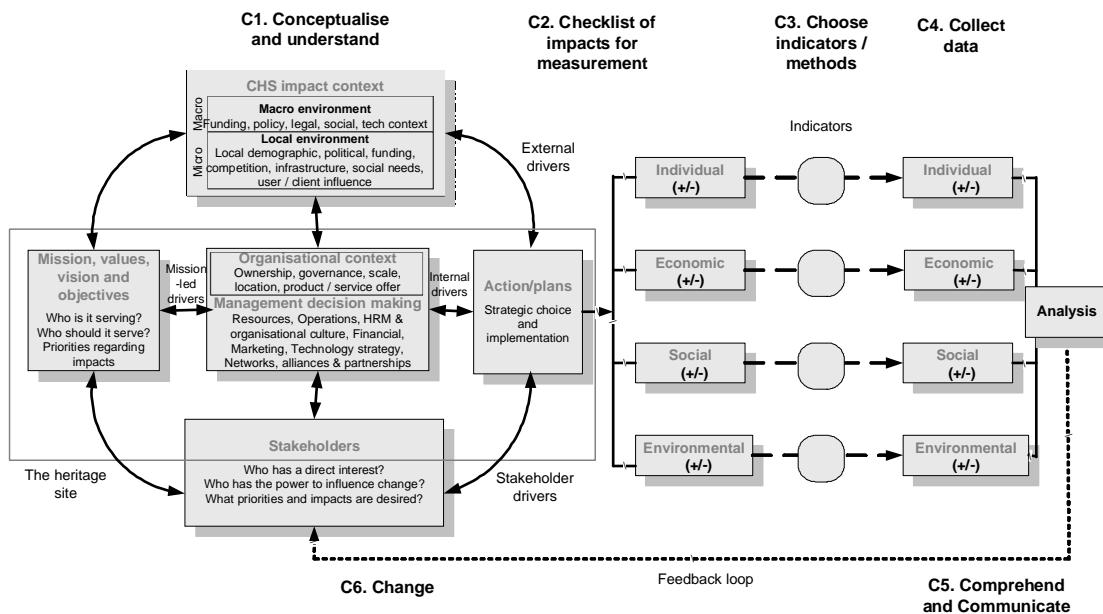


Figure 2: A conceptual diagram of the Heritage Impact Training model.¹

The second part of this first stage involves the identification and prioritisation of the impact categories. Managers should be able to:

- Measure what matters
- Understand the specific impact influences/value drivers
- Impacts on whom? For whom?
- What is important to measure?
- Is there consistency between purpose of measurement and the measures chosen?
- Who decides on relevant impacts?

¹ This framework has been recently adapted to the needs of the social enterprise sector (see Social Enterprise London 2006).

Tools

Apply HIT model to show how to generate and prioritise impact.

Supporting tools

Mission/objectives generation guide, strategic decision model, weighted PEST impact grid, SWOT (strengths, weaknesses, opportunities, threats), Stakeholder ranking and mapping matrix (Apply power/interest matrix). Apply overall Impact selection grid.

C1 of the 6Cs HIT model is based on a modified version of the holistic site model presented previously (see Figure 3, McLoughlin, Kaminski, and Sodagar 2006, with modifications). The strategic review can be used by heritage site managers to conceptualise the factors that influence the wider impact that a site could potentially have.

The holistic impact model consists of five elements: The impact context of the heritage site, the site's mission and objectives, the site stakeholders, and the site management and decision-making context/organisational context, which all influence and contribute to the potential socio-economic impacts of a heritage site. The different components of the holistic framework model and its relationship to impact evaluation are examined below.

To support deeper analysis of the holistic impact model, the selection and application of established strategic and management tools would be useful (e.g. PEST, SWOT, etc).

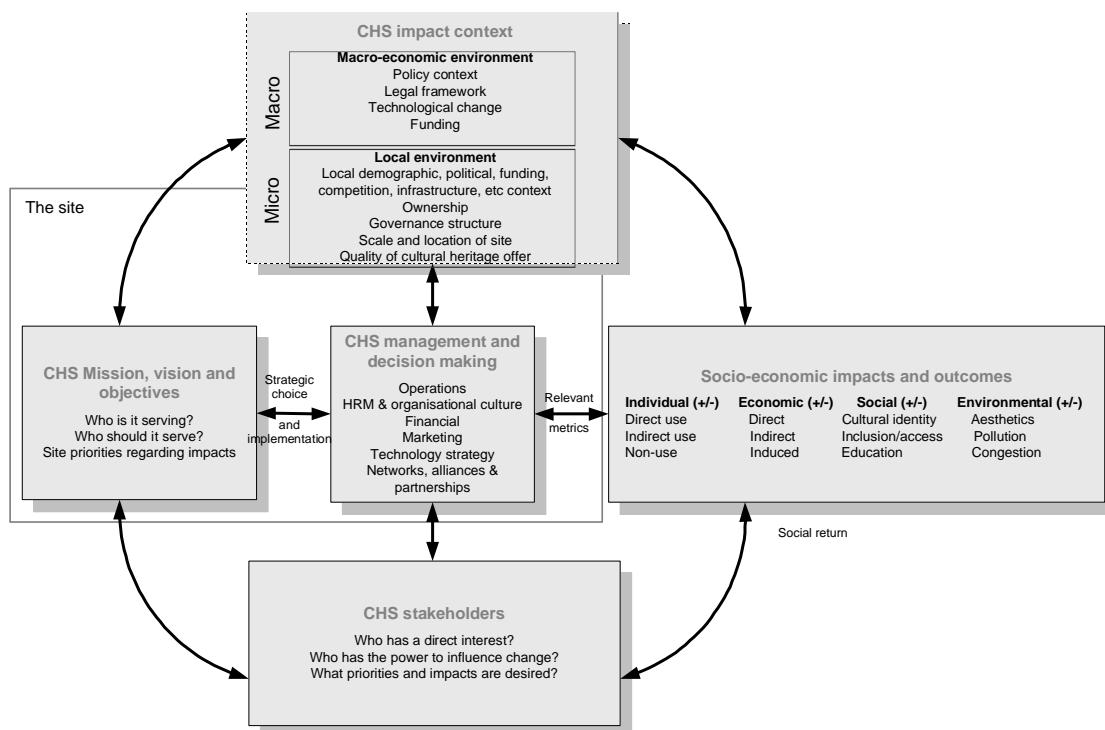


Figure 3: The 2006 holistic impact model for cultural heritage sites.

1.4 The heritage site impact context

The holistic framework has been refined since 2006. Internal factors such as ownership, governance, scale, location, and the product and service offer are now grouped under the heading of 'organisational

context', and are placed firmly in the realm of the site. Such a division of external and internal contextual drivers is widely used in strategic models.

The impact context is interpreted broadly as the specific macro-contextual influences and micro-contextual (such as organisational) influences on a cultural heritage site. Macro contextual influences can include: Macro-economic environment, policy context, legal framework, cultural context and values, and technological context. The micro-contextual influences relate to the local environment. These influences can include: Economic, political, funding, demographic, legal, competition, infrastructure, etc.²

For heritage managers the impact context creates opportunities and threats for their organisations and can impose constraints on decision making. Most of these factors are beyond the direct control of cultural heritage managers, but nevertheless affect heritage site strategies and final impacts and outcomes. Furthermore, many of the factors are inter-related and so, for example, local economy could affect heritage site funding or the policy context could affect the legal framework.

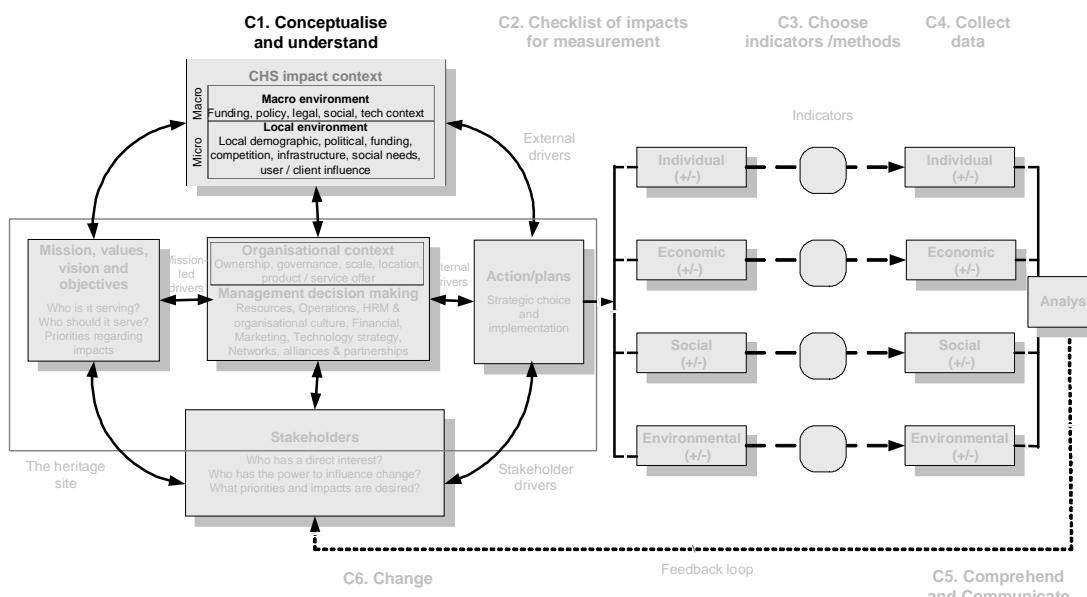


Figure 4: The external impact context of the Heritage Impact Training model.

The macro context

Each site operates in a macro-national context (and wider European and global context). A number of influences from this context affect heritage sites; these include:

- *Macro-economy*: The macro-economy (regional, national and international) affects, for instance, tax revenues, disposable income, and policy funding priorities. The macro-economy has a major influence on the heritage sector.
- *Policy context*: Policy is fundamental to understanding impact; it influences heritage sites at multiple levels. It determines what gains funding and what does not, what is conserved and what is not, it influences local authority policy, and it can also affect national legal structures which influence the heritage sector, etc. (Mignosa and Rizzo 2004, Rizzo and Mignosa 2006).

² Of course, some elements within the impact context (such as policy, funding and legal frameworks) can straddle the border between macro and micro influences.

- *Cultural context and values*: The ‘cultural context’ and values of a society in supporting heritage, will in turn affect practical policy and funding priorities. For example, the cultural context helps define heritage.
- *Technological context*: It is important to consider technological developments and how these might affect the visitor experience. New ICT hardware, software and their associated standards are being developed continually. The applicability of these technologies and standards to the heritage sector is dependent on economic and social factors such as cost and user acceptance. For example, in the last fifteen years websites have become an integral part of heritage marketing and presentation. This has only become possible through the global advances in ICT and the acceptance and penetration of the PC and Web use in households across Europe.

Similarly, the development of technology such as ICT takes place outside of the cultural heritage sphere (usually in the commercial or military sectors) and gradually migrates to the heritage sphere.

The micro context

Micro factors would include the local economy and local policy and political context.³ For example, numerous local authorities and governments have developed strategies, with accompanying funding, targeting heritage as a key element in regeneration programmes.

In heritage sites with a strong orientation towards tourism, a principal element of a site’s economic impact will depend on the total visitor experience, which itself is dependent on numerous off-site factors (e.g. coordinated local tourism strategy, the presence of other visitor attractions, quality of facilities such as transport, restaurants, hotels, etc). It is rare for a heritage site to be immune to these factors.

The degree of competition or complementarity with other attractions can also influence impact. For example, a heritage site within a historic urban centre (such as Rome, Venice or Paris) could face competition from numerous alternative heritage attractions; however, the nucleation of heritage sites within a town or city can act as a stimulus to attract visitors. In such cases the visitors would be more likely to be interested in heritage tourism. Such situations have been given the label ‘co-opetition’. Of course, the competition is not limited to other heritage sites – any attraction which could divert tourist money away from heritage represents potential competition – but the creation of a diverse tourist product offering is likely to be beneficial for attracting a more diverse range of visitors.

1.4.1 Tools for site managers

A PEST analysis of environmental influences:

³ The term ‘micro’ has different meanings in business and economics. In the context of the above model it is used to indicate two levels – the ‘local’ socio-political environment and the site itself.

Political/legal	Economic factors
Heritage policy Taxation policy Employment law Government stability	GNP trends Interest rates Money supply Inflation Unemployment Disposable income Energy availability and cost
Socio-cultural factors	Technological factors
Population demographics Income distribution Social mobility Lifestyle changes Attitudes to work, leisure & the past Education levels	Government research Industry focus on ICT New technological developments Speed of technological transfer Rates of obsolescence

Figure 5: A PEST analysis of environmental influences.

1. What environmental factors affect the organisation?
2. Which of these are the most important at the present time? How are these likely to change in the next few years?

Opportunities	Threats
New markets and segments	New market entrants
Quality of heritage assets	Increased competition
Diversification opportunities	Increased pressure from visitors and suppliers
Market growth	Substitutes
Competitor weakness	Low market growth
Physical location	Economic cycle downturn
Demographic and social change	Technological threat
Change in political or economic environment	Change in political or economic environment
New takeover or partnership opportunities	Demographic change
Economic upturn	New international barriers to trade
International growth	

Table 1: Strengths and weaknesses analysis: the heritage site's external context.

Training summary

The external contextual drivers are those elements beyond the control of an organisation but which can affect the impact a site can make.

Heritage site managers wishing to assess these external contextual factors at their site can conduct a SWOT (Strengths, weaknesses, opportunities, threats) analysis. The external drivers are the equivalent of the *strengths* and *weaknesses* of the SWOT analysis

Managers should consider how important these are and if they help or limit the positive effect of the heritage site.

1.4.2 Mission and objectives

The mission can be thought of as a heritage site's overriding purpose. Mission of an organisation outlines the broad general directions that an organisation should and will follow. Questions that need to be asked include: What is the site there for? Whom is it serving? Whom should it serve? Why is it being funded?

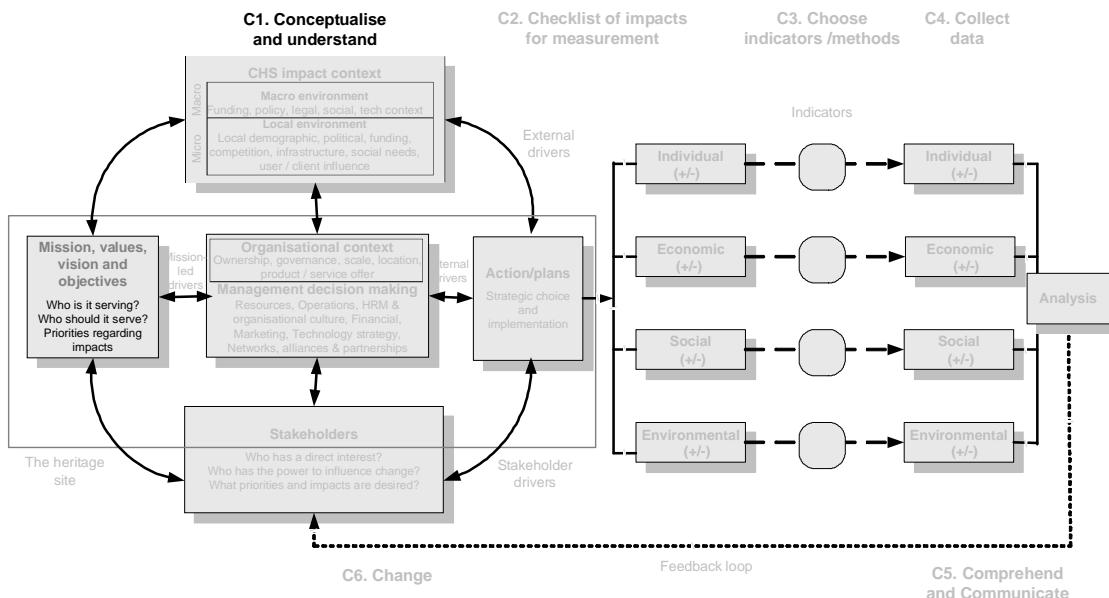


Figure 6: The mission, values and objectives of the Heritage Impact Training model.

All heritage sites have a sense of their mission, either explicitly or implicitly, which partly reflects the impact context (the culture, the national system, and corporate governance and legal system) and also the power and interest of the stakeholders. As a process, not least to guide an impact evaluation, it is useful to know who decides the mission and how it is decided (see Figure 6).



Figure 7: The influences on the formulation of mission and objectives of a site.

The objectives of an organisation represent a more specific commitment, often over a specified time period, consistent with the mission (this may be quantified, but this can be inappropriate in some circumstances). Objectives take the generalities of the mission and turn them into more specific commitments: Usually this process will cover what is to be done and its timing. Different kinds of objectives are possible: Some will be quantified, some not. Of course, there may be conflict between objectives, particularly between the long-term and short-term interests of the organisation. Typically, objectives should be *challenging but achievable*.

Objectives may be seen as more of a heritage management tool, being statements of specific outcomes to be achieved which may or may not be measurable. For example, in the UK there is a national benchmarking process for museums that offers comparisons against certain prescribed criteria. There are also performance indicators being employed by various museums. Despite the growing targets/objectives culture in the public sector of the UK there is a need to be sceptical of their role and aware of the potentially distorting effects in delivering a service.

Most heritage sites express their values in two key ways: Through their services (what they do), such as addressing educational and social needs; their organisational practices (how they do it); who owns, controls and benefits from the value created by the heritage site, employment practices (who is employed, participation, job design, etc); and the relationships between different stakeholder classes.

One role of a socio-economic impact analysis would be to evaluate the extent to which the mission, values and objectives are being achieved. Are the intended outcomes being delivered? Should the mission and objectives be revised? Which impacts should be evaluated?

Training summary

Heritage site managers should review their mission, objectives and values and evaluate the extent to which the mission and objectives are being achieved. Are the intended outcomes being delivered? Should the mission and objectives be revised? Which impacts should be evaluated?

1.4.3 Organisational context

Organisational context is central to understanding impact. The impact of any site is heavily dependent on its location, quality, significance and the scale of the heritage site itself. As sites vary in their local,

regional, national and global significance then so will their relative impacts. Some factors to consider include:

- *Ownership*: The ownership of heritage sites is a principal determinant of the impact that a site will have. Ownership influences funding sources, governance structures, objectives, etc. However, ownership of heritage sites is not static. For example, because cultural heritage sites can have high maintenance costs – especially in countries with strictly enforced legislation regarding the upkeep of such sites – there is a tendency in such countries to see the movement of ownership from private to public hands. (Although, there are limits to the size of the public purse and without sustainability it is questionable for how long the transfer of assets from private to public hands can take place).
- *Corporate governance*: Heritage sites can have a wide range of governance structures ranging from private and public, to not-for-profit and charities. Each of these will influence the impacts and outcomes of a heritage site. While it would be simplistic to assume that all sites under private ownership have a greater profit motivation than sites in public ownership there is a trend towards this scenario that cannot be ignored.
- *Location*: Location is paramount for the impact of a cultural heritage site. The location determines factors such as accessibility to transport networks, proximity to population centres links with other potential attractions.
- *Quality of the cultural offer*: This exists at two levels. The significance of the site to society, and the quality of the ‘visitor offer’.
- *Significance*: The significance and importance of a site is a difficult entity to define. Sites have significance at multiple levels such as local, aesthetic, regional, and national.
- *Quality of the visitor offer*: The quality of the visitor offer at a heritage site or experience can be determined by a number of factors such as the level of preservation, which lies outside the scope of the heritage site. However, site maintenance, level of restoration and visitor facilities tend to fall within the potential control of a site, finance depending, as can the actual or perceived authenticity of the site.
- *Scale*: Scale can act as a guide to the potential impact of a cultural heritage site (although, no more than a guide). Larger sites have the potential to induce a greater impact than smaller sites, because of their ability to support a greater throughput of visitors, sustain larger potential capital costs, higher staff requirements and other running costs. Of course, concentrations of smaller heritage sites can have a similar effect.

Strengths	Weaknesses
Leadership and management skills	Low on key skills
Financial and cash resources	Limited financial and cash resources
Innovation in the organisational culture	Innovation not in the organisational culture
Human resources	Poorly motivated human resources
Location	Inaccessible location
High quality heritage offer	Low quality of heritage offer
Differentiated cultural offering	Undifferentiated cultural offer
Service levels	Poor service levels

Table 2: Example heritage site internal context strengths and weaknesses analysis.

These factors have a strong influence on the site – and feed into the management decision-making context. Furthermore, it is argued that contextual factors are immensely important determinants of the socio-economic impact of heritage sites. Placing a heritage site in context will guide what impacts should be

evaluated. For instance, there would be little point in doing a full, and often costly, economic impact analysis of a small museum based in a large city that was designed to serve the local community and foster local cultural identity. In such a context impact assessment should be aimed at issues of community integration and social inclusion, etc.

When analysing resources questions to consider include:

- What key industry factors deliver the objectives?
- How do resources add value to the organisation?
- How can value added be improved?
- Which resources are particularly important in adding value and competitive advantage?
- How can competitive advantage be enhanced?

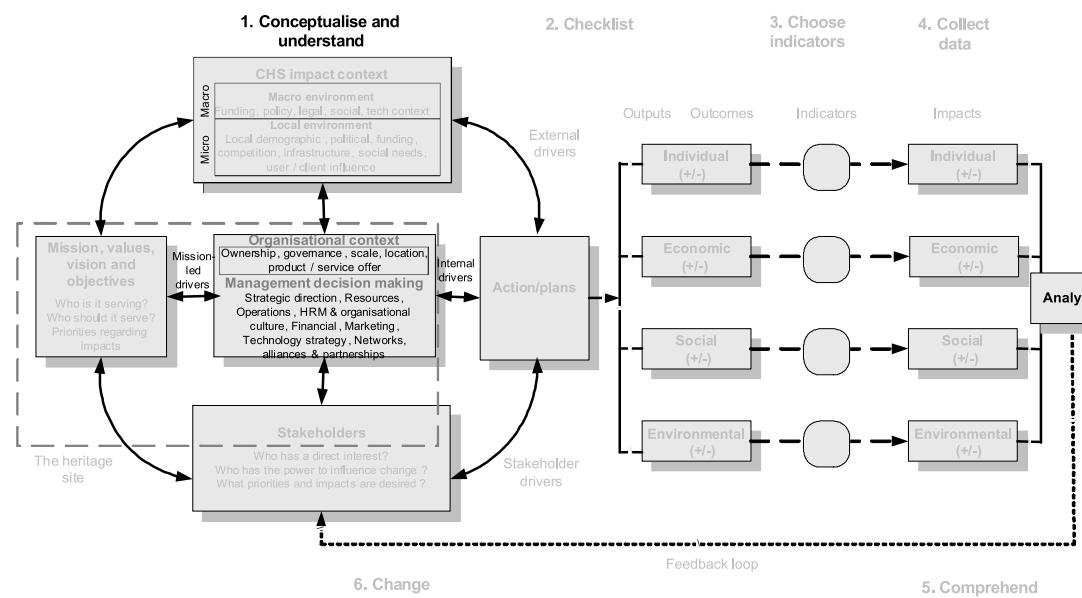


Figure 8: The organisational context and management decision making component of the Heritage Impact Training model.

1.4.4 Management decision making

The quality of the heritage management decision making will have a strong influence on final impacts. Many impacts studies either ignore this or treat it as a black box. The principal elements in the management decision-making element include operations, financial, marketing, human resource management and organisational culture, and technology strategy.

- *Operations*: Operations management considers how resources such as capital, people, information and materials are converted into outputs such as services and information (products). Cultural heritage site operations management is made more complex by the lack of funds.
- *Financial*: The cultural heritage sector is perennially short of funds. Increasing competition for central funds, increasing operational costs, and an increasing number of heritage sites make this situation unlikely to change. The management of financial resources within heritage sites is crucial.
- *Human resources*: The effective management, training and motivation of personnel within heritage sites are other factors that can influence impact. This affects all levels within a site from management

to voluntary staff. The drive and determination of heritage site managers is crucial to the long-term success of sites. With funding being such an issue in the sector, financial incentives for high-end managers are poor and considerable reliance is placed on the dedication and devotion of managers in the sector. Correspondingly, heritage sites often have highly qualified staff with postgraduate qualifications who are paid correspondingly less than in other sectors. This situation requires careful management. Furthermore, many heritage sites increasingly use voluntary labour to support many functions in the day-to-day running of sites. This also requires careful management. Human resource management issues also exist beyond the level of the site.

- *Marketing:* The marketing strategy will influence the number and type of visitors, which determines key final economic impacts. With often limited marketing budgets, a key marketing strategy will be the extent that sites can leverage advertising and promotion by combining with other interested partners in joint marketing campaigns. The increasing number of undergraduate and post-graduate courses, and academic books devoted to heritage marketing suggests that there is a growing awareness of the critical nature of marketing in the cultural heritage sector. Furthermore, the growing number of heritage special interest groups in the marketing sector further reinforces this trend.

This raises the need for regular impact reports based on efficient accumulation of relevant data to feed back into strategic decision making and influencing future investment decisions. For example, few sites have a *detailed* breakdown of their visitor profile. Not only is this useful impact data but it can enable more targeted marketing strategies to take place – further enhancing desired impact. This presents socio-economic impact as a dynamic rather than static notion.

Training summary

The internal contextual drivers are those elements beyond the control of an organisation but which can affect the impact a site can make.

As with the external drivers heritage site managers wishing to assess these internal contextual factors at their site can conduct a SWOT (Strengths, weaknesses, opportunities, threats) analysis. The internal drivers are the equivalent of the *strengths* and *weaknesses* of the SWOT analysis.

Managers should consider what aspects of their organisation and its every day operations have an effect on the impact it able to create. What factors limit this? What factors allow it to excel?

1.4.5 Stakeholders

- The holistic model places stakeholders as a separate dimension of impact because they are a key consideration for all the other components of the model either directly or indirectly to influence final impacts.⁴

⁴ Of course, stakeholders are not separate entities, they are integral to all the components of the framework from management decision making, mission and objectives, to impact context.

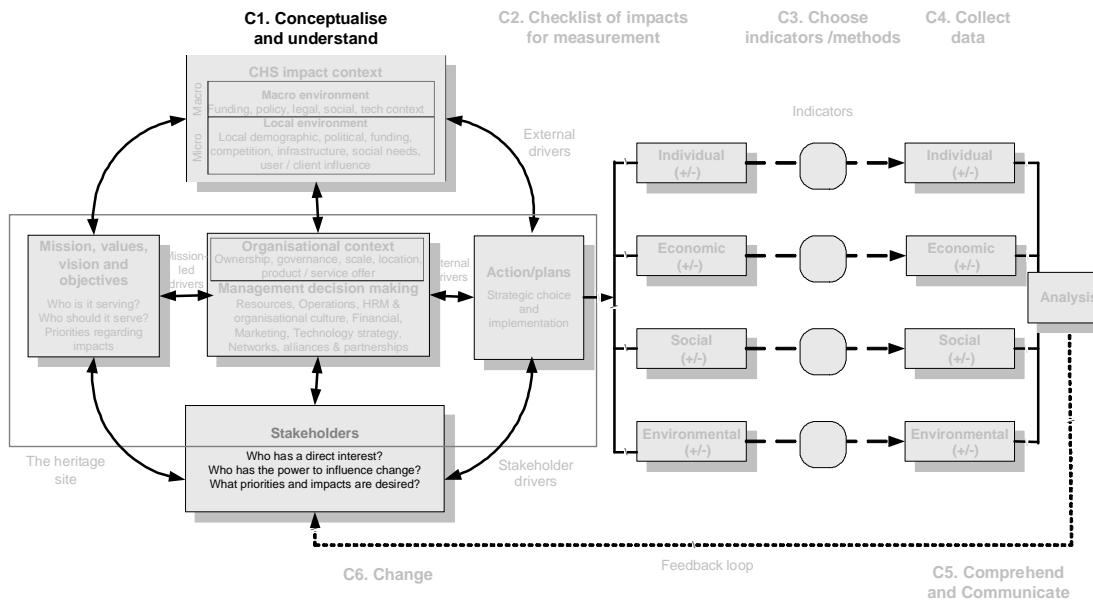


Figure 9: The stakeholders component of the Heritage Impact Training model.

There are numerous definitions of stakeholders; “Stakeholders are those individuals or groups who depend on the organisation to fulfil their own goals and on whom, in turn, the organisation depends” (Johnson, Scholes and Whittington 2006). Broadly speaking ‘stakeholders’ encompasses all those who have an interest in the site and its running. Stakeholders are critical for impact evaluation, because they have:

- A key role in forming a site’s mission and objectives
- Strong influence over strategy and management decision making
- Importance in establishing which impacts are priorities and which are selected for measurement, and
- Influence over the cost and complexity of the impact measures chosen.

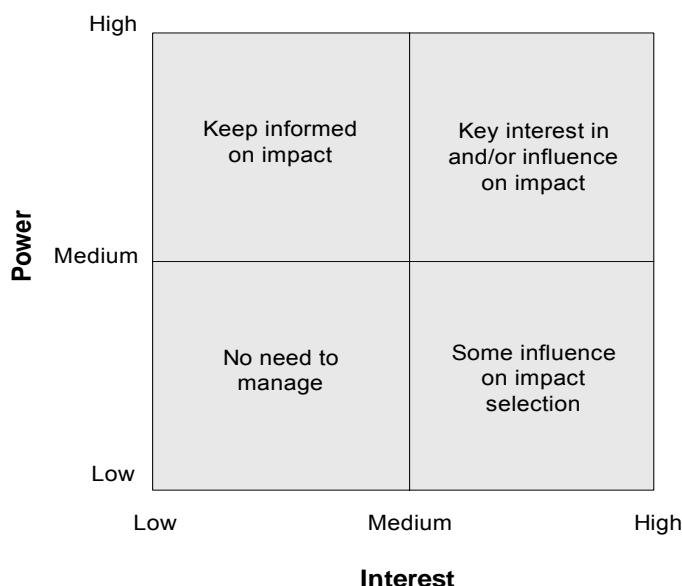


Figure 10: A power/interest matrix applicable to cultural heritage stakeholders.

Stakeholders can be divided into a number of groups:

- Group A stakeholders: General public, press
- Group B stakeholders: Heritage interest groups, heritage support networks
- Group C stakeholders: Local authority, trade associations, wider client groups
- Group D stakeholders: Funding organisations, narrower client groups, trustees, the board of directors, staff, and family of staff.

Of course each of these groups has differing levels of power and interest in the heritage site.

For example, a museum curator or the board of directors would have both a high interest in the impacts of the site and a high power to influence change. Many heritage sites are publicly financed and are required to be accountable to a range of stakeholders. When difficult strategic or investment decisions are being considered it can be useful to map stakeholders in terms of their power and interest in the outcomes of a decision to aid the political process of the decision making. Stakeholder analysis can take on a variety of forms and different stakeholders will vary in power and interest depending on a decision to be taken. Relevant issues here would be:

- Who and how do they influence the impact context (e.g. corporate governance)?
- Who and how do they influence the mission and objectives?
- Who and how do they influence management decision making?⁵

A suggested approach to stakeholder analysis for heritage sites would be to:

- Identify the major stakeholders.
- Establish their interests and claims on the organisation, especially as new strategy initiatives are developed.
- Determine the degree of power that each group holds through its ability to force or influence change as new strategies are developed. Which stakeholders are most influential in determining impact measures?
- Develop mission, objectives and strategy, possibly prioritising to minimise power clashes.
- Consider how to divert trouble before it starts, possibly by negotiating with key groups.
- Determine their perceived impact of the site.

Possible questions for stakeholders include:

- What are the perceived major impacts of the site?

⁵ Perhaps a more novel use of stakeholder analysis would be to use it directly for generating preliminary impact findings in their own right. The authors tested this approach on Brighton's Royal Pavilion Palace heritage site. Various stakeholders were interviewed to identify the key impacts that they perceived from the heritage site and they supplied relative weightings to their stated impacts. This approach helps to identify priority impacts for evaluation. Initial results showed that a number of different impacts were revealed that would not have been captured in a conventional impact study. From an economic perspective it also showed that standard economic measures driven by visitor figures/average spend failed to capture the significance of the full economic impact. It also posed new challenges in terms of measuring impact, such as how to measure a site that is an iconic brand for a city.

- What are the desired impacts of the site?
- Which impacts are most important to them?
- To rank/weight the impact importance of these.

This level of analysis should highlight certain impact priorities. For example, is it driven by funding bodies, local government policy, visitor feedback, or legal requirements, etc?

1.4.6 Strategic choice and implementation

The quality of leadership and strategic thinking not only defines the mission and objectives but sets the visions, makes the key directional choices and innovations, and implements and manages strategic change. The key questions to any heritage site manager needs to answer are:

- Where is the site positioned now?
- Where does the site want to be positioned?
- How can this be achieved?

This last question is where management decision-making comes to the forefront of site strategy.

Training summary

The stakeholders are defined as all those who have an interest in the site and its running.

Managers should conduct a power interest analysis of their stakeholders using the matrix provided to determine:

- Who and how do they influence the impact context?
- Who and how do they influence the mission and objectives?
- Who and how do they influence management decision making?

1.5 Checklist (C2)

In C2 managers draw up a checklist of desired/perceived impact measures which emerge from the conceptual and strategic analysis (C1). Impacts have been divided into groups in order to make their assessment more coherent. This ‘bottom line’ comprises individual, economic, social, and environmental impacts.

Managers need to prioritise the impact categories for measurement. For example, if economic impact is not a priority then there is no need to devote resources to measuring it.

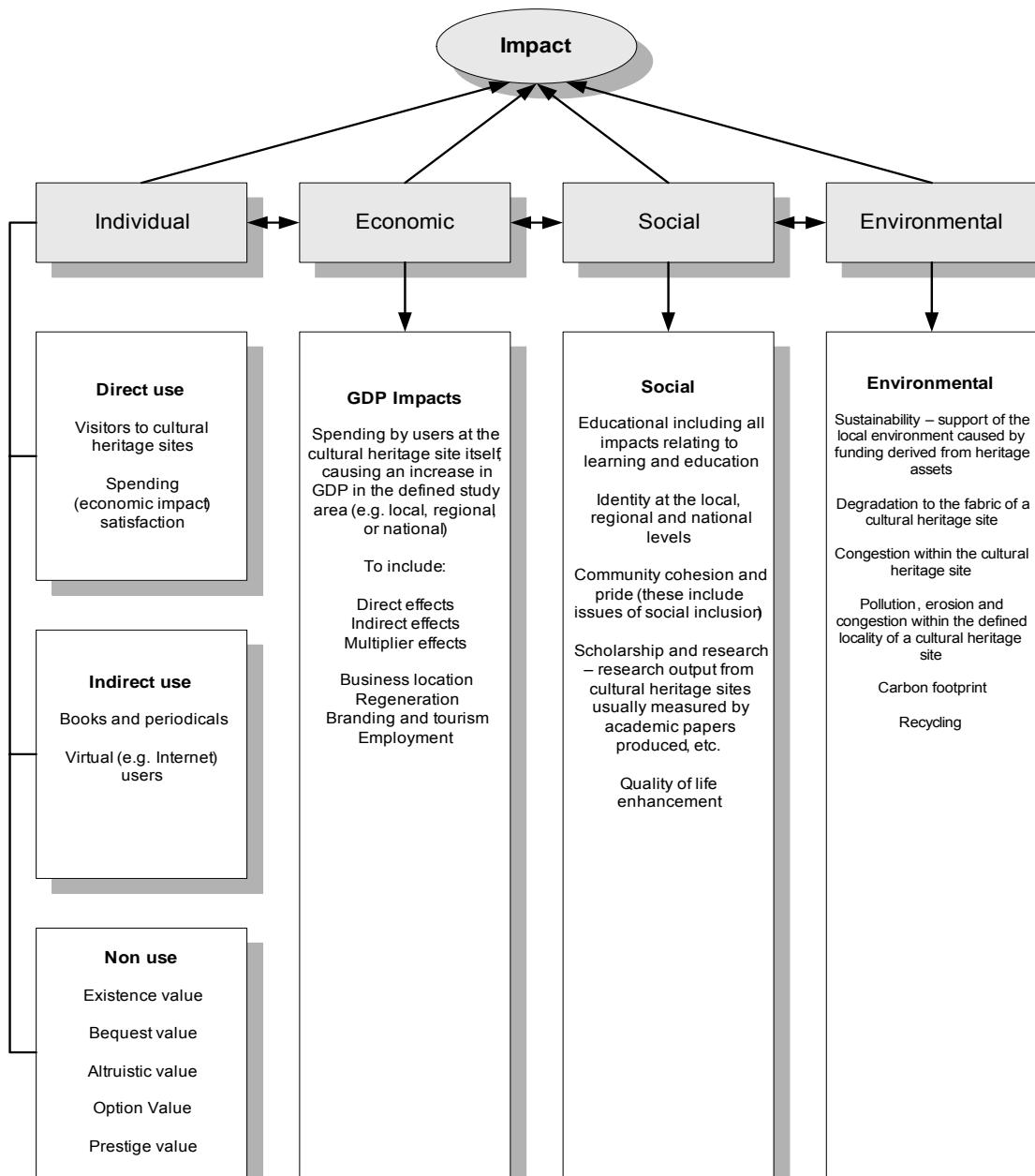


Figure 11: The impact/outcomes framework.⁶

Tools

- Apply the Impact/outcomes framework
- Select from generic impact indicators
- Generate own relevant indicators/metrics (impact)

⁶ Modified from the Outspan Group 1999: 7.

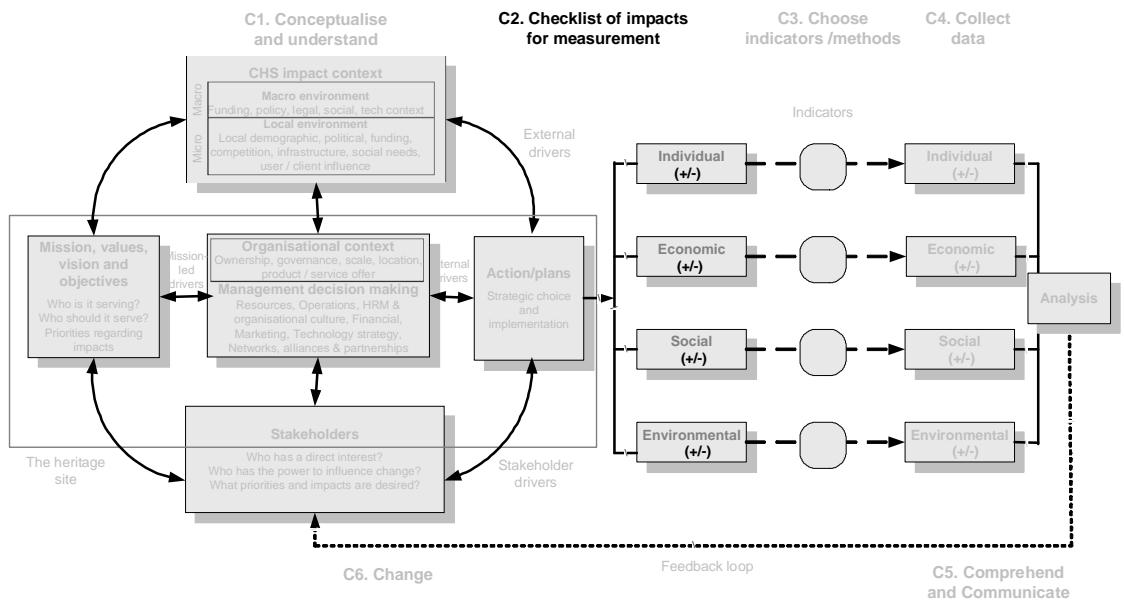


Figure 12: Using the 6Cs HIT model to create a checklist of desired impact measures.

Tools

- Apply the Impact/outcomes framework

1.6 Choose impact indicators (C3)

All heritage sites (and all businesses in general) generate impact, positive or otherwise, in each of the four impact areas. A Key Performance Indicator or KPI is a quantifiable metric that an organisation can develop to help understand and gauge its performance. When properly configured and regularly monitored, KPIs are useful because they:

- Reflect the critical success factors of an organisation
- Help an organisation measure overall progress towards defined goals or targets
- Alert managers as to how well an organisation is functioning
- Highlight an organisation's impact, which can be both good and bad
- Help an organisation compare its performance with that of other, similar organisations – against standards and benchmarks.

The choice of impact indicators should be against agreed criteria. The following criteria should be considered:

- Relevance
 - Fit to purpose of the heritage site
 - Satisfy stakeholders
 - Impact for whom?

- Measurability
 - Quantitative versus qualitative
 - Can what is trying to be measured be broken down into key component measures?
 - If no direct measure is available, can a proxy be identified? If not acknowledge that only partial indicators can be developed.
 - Are there monetary proxy values?
 - Are monetary measures for non-market outcomes valid?
 - Are composite measures valid? (consider what weighting should be used)
- Availability: What level of information can be collected easily?
- Comparability with others (for some stakeholders): identifying appropriate benchmarks on a case-by-case basis
- Cost of data collection
- Complexity of formulating the measure
- Ease of analysis of the measure? Is it meaningful?
- What are its limitations?

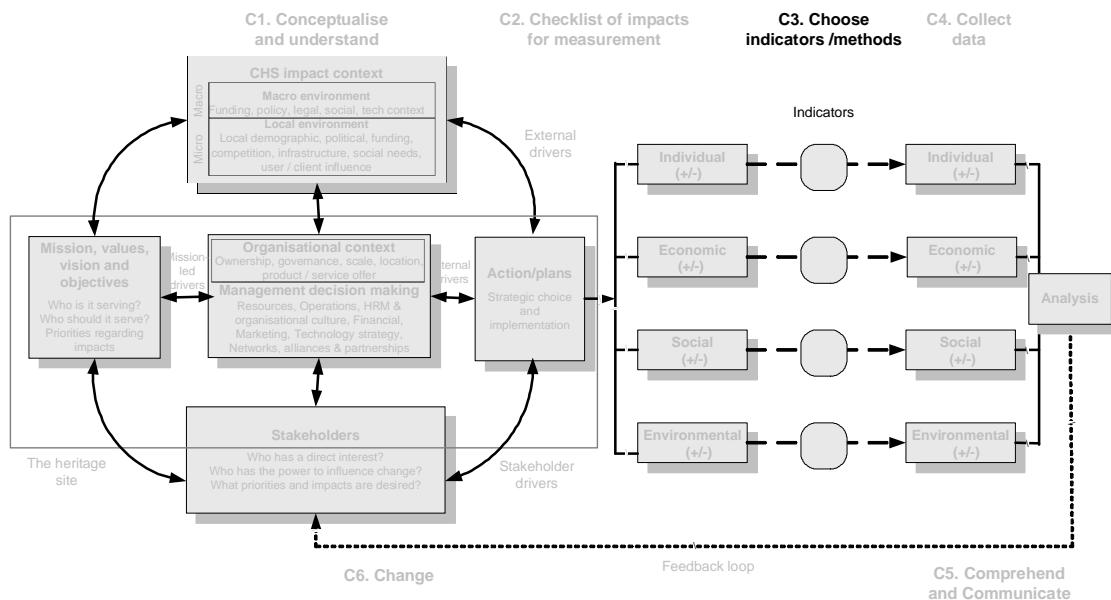


Figure 13: Using the 6Cs HIT model to choose impact indicators.

KPIs are frequently used to ‘value’ difficult-to-measure activities such as the engagement with beneficiaries, service level standards, and satisfaction with the product or service. KPIs could include:

1.6.1 Social

Examples of social indicators could include:

- Number of volunteers as a proportion of the total population of a local authority's area (per 1,000 head of population)
- Proportion of users of museums that are from identified priority groups
- Number of schools that are engaged with museums as a proportion of the schools within a local authority's area
- Number of uses of a museum's on-line assets.

1.6.2 Economic

Examples of economic indicators could include:

- Cost per usage of museum physical and on-line assets
- Cost of museum service per head of population, per visitor and per loan
- Grants as a percentage of total museum expenditure
- Number of paid admissions

1.6.3 Individual

Examples of individual indicators could include:

- Percentage of users satisfied with museum or heritage site services.
- Number of comments in the visitors book.

Tools

- Indicator/criteria checking grid
- Use cost/complexity matrix to influence decision
- Select from generic impact indicators
- Generate own relevant indicators/metrics

1.7 Collect the data (C4)

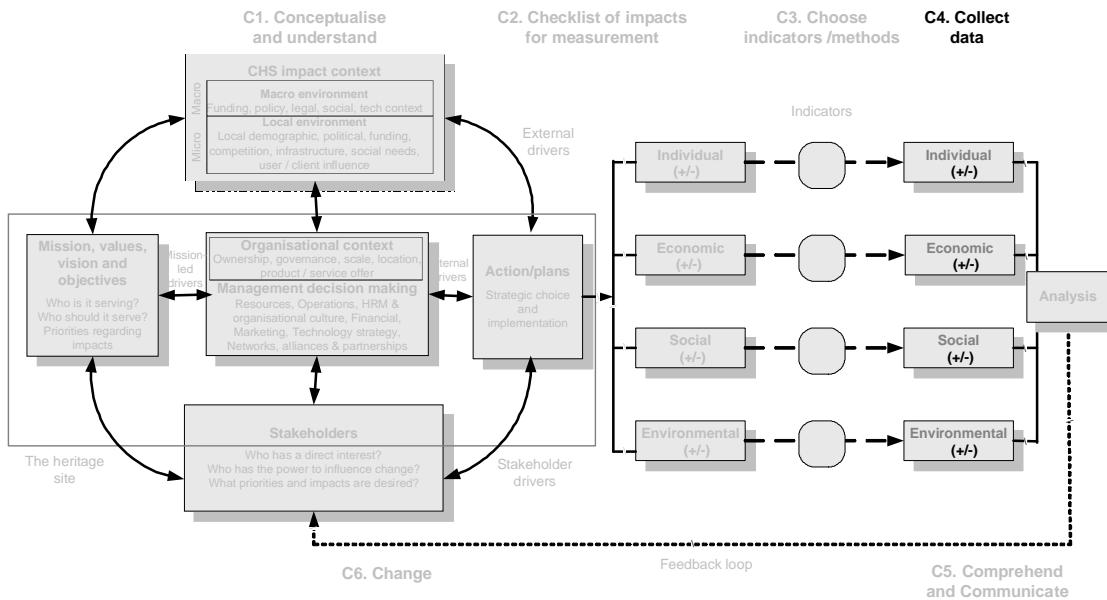


Figure 14: Using the 6Cs HIT model to collect the data.

This step revolves around the collection of the data and how to do it. The methods used should be decided on (such as internal records/questionnaires/surveys, etc). This would also be an appropriate time to review management systems in regard to the collection of data in the future.

- Systems and procedures need to be established for data collection
- Responsibility for collection of data needs to be set, in conjunction with time targets
- Consistently review the quality of the data

Use training to establish the importance of impact measurement in the organisational culture. The essence is that “we measure it because we value it and we want to tell it.”

Tools

- Indicator/method grid (consider the advantages and disadvantages).
- Establish systems and procedures
- Set responsibility for collection of data, in conjunction with time targets
- Consistently review the quality of the data

1.8 Comprehend and communicate (C5)

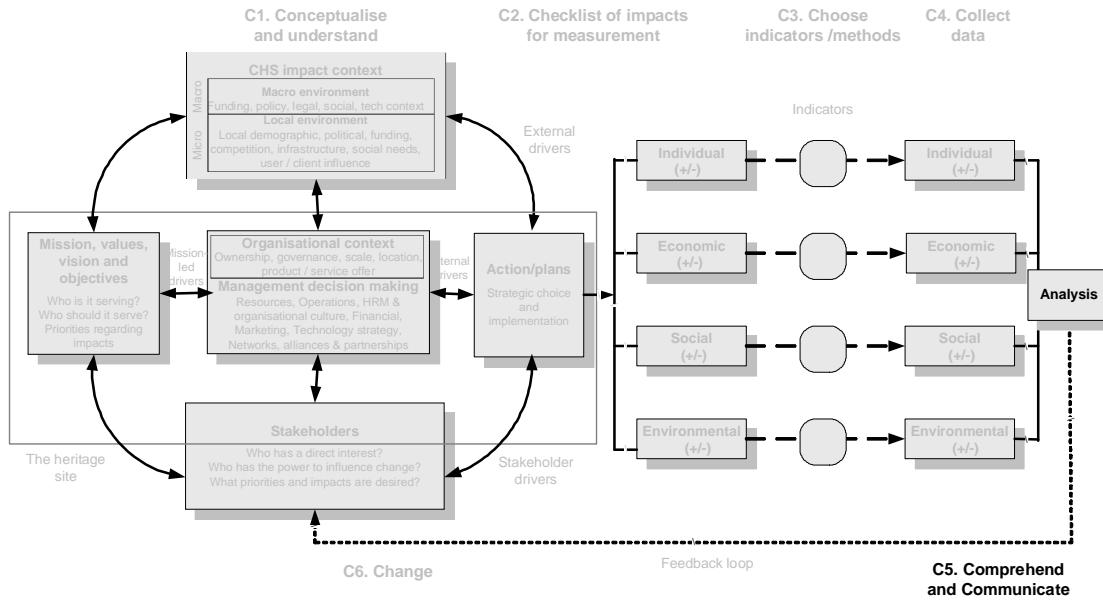


Figure 15: Using the 6Cs HIT model to comprehend the impact data.

Comprehension is achieved through the analysis of the impact data. This is also an appropriate time to review the indicators chosen and assess their usefulness.

It is also essential that the lessons learnt from the analysis are communicated in a targeted way to the relevant stakeholders. The results should also be compared with past performance benchmarks.

Tools

- Spreadsheets/statistical guides/MIS
- Compare with previous impact results (if available)
- Compare with benchmark organisations
- Is the organisation's mission being met?
- Are the perceived or desired impacts being achieved?
- Are the stakeholders satisfied?
- Decide on modes of impact communication and reporting
- Communication targeted at the stakeholders

1.9 Change (C6)

C6 involves the feedback of the analysis of impact data into the strategic, operational and business processes of the site. This is one of the most crucial components of the 6Cs, and one that is so often omitted. This is the most important reason for sites to conduct impact analysis – to see if the organisation can be improved. Considerations include:

- Undertake strategic/operations review
- Influence on policy/funding/strategy

- Propose changes (including new technology investments)

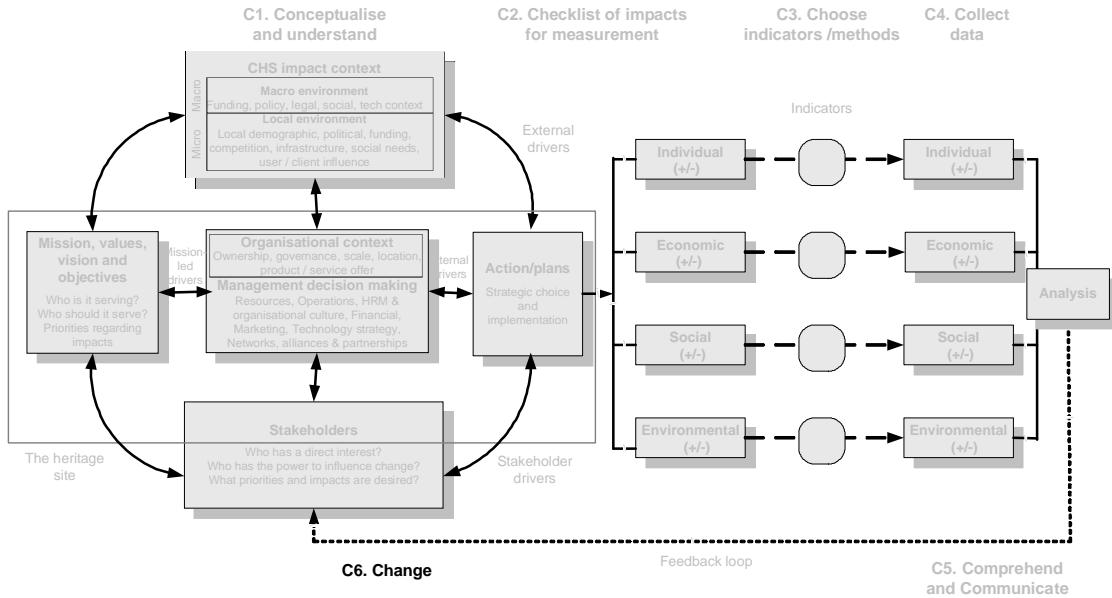


Figure 16: Using the 6Cs HIT model to compare and consider change to the organisation.

In order to achieve this, results from the impact analysis need to be compared with previous data from the site and that of benchmark organisations. Consideration should also be given to questions such as is the mission is being met? Are perceived /desired impacts being achieved? Are the stakeholders satisfied? With all this it should be possible to conduct a strategic/operations review, and propose changes for the future.

Consider new strategies, business processes, systems and organisation. The potential for new investment in areas such as technology should also be evaluated.

Tools

- Holistic impact model, relevant management tools (strategic models, etc).
- On-going strategic review
- Use classical management tools
- For new investment in technology use the ICT investment model

1.10 Reflections on impact measurement methods: The cost complexity dilemma

It is clear that for each area of the ‘bottom line’ studied there are levels of study that increase in cost and complexity.⁷ For example, if ‘economic’ impact is studied (see Figure 17) then the simplest and therefore cheapest methods revolve around the study of cash flows around visitor numbers; as more information is gathered the cost increases. For example, gathering information about visitor profile, or visitor expenditure at the site starts to increase cost and the complexity of analysis. If a site wishes to conduct a more complex analysis such as a questionnaire-based non-market valuation, the cost increases markedly, often beyond the resources of most heritage sites (see McLoughlin *et al.* 2007: 84).

⁷ The ‘bottom line’ in this context is defined as impacts and outcomes in the areas of the individual, economy, society and environment. See previous EC deliverables.

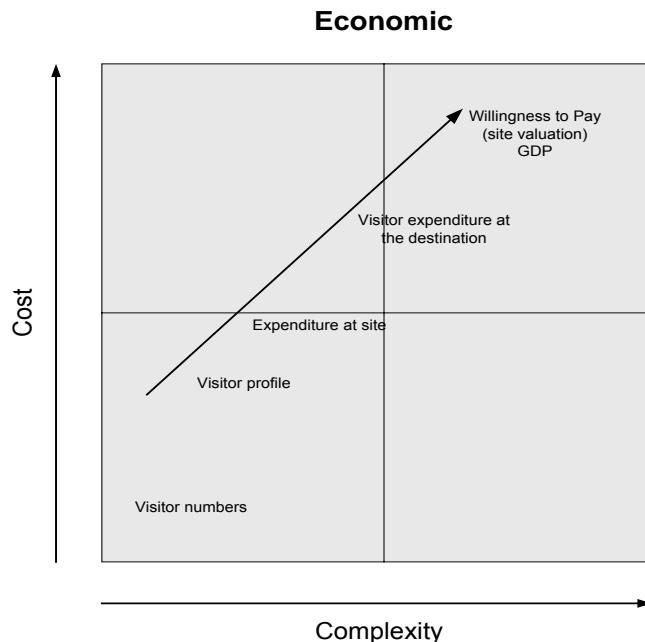


Figure 17: A cost complexity-matrix highlighting the position of various economic methodologies.

The same issues apply to all areas of the bottom line being studied, whether individual, economic, social, or environmental. For example, an assessment of the *social* impacts and outcomes of a site increase in cost and complexity from simple measurement of numbers of visitors, to determining the socio-economic group of those visitors, and conducting studies of community identity and social cohesion (see Figure 18). As more human resources are required to obtain the data and conduct the subsequent analysis then costs and complexity increase. This is especially the case in the study of social impacts where higher-level information requires the use of interviews to acquire the raw data.

Similarly, with an assessment of the environmental impact of a heritage site simple calculations of energy use are relatively easy to obtain, but quantifying the percentage of recycled waste and carbon emissions requires more resources to acquire the information (see Figure 19).

When deciding on which activities to study consideration must be made of costs and complexity. Sites may wish to measure impact using sophisticated techniques, but the time and resources required to do so may be prohibitive. By listing all possible areas to measure impact it is possible to choose the most efficient and cost effective.

1.11 The challenge

The challenge is therefore to produce models and tools that can be used by the heritage sector which produce robust, comparable results, but whose cost and complexity is reduced to such an extent that it is accessible to small to medium heritage sites (see Figure 20). Extensive study of the sector has shown that methodologies that are complex and costly are not adopted, unless imposed from above.

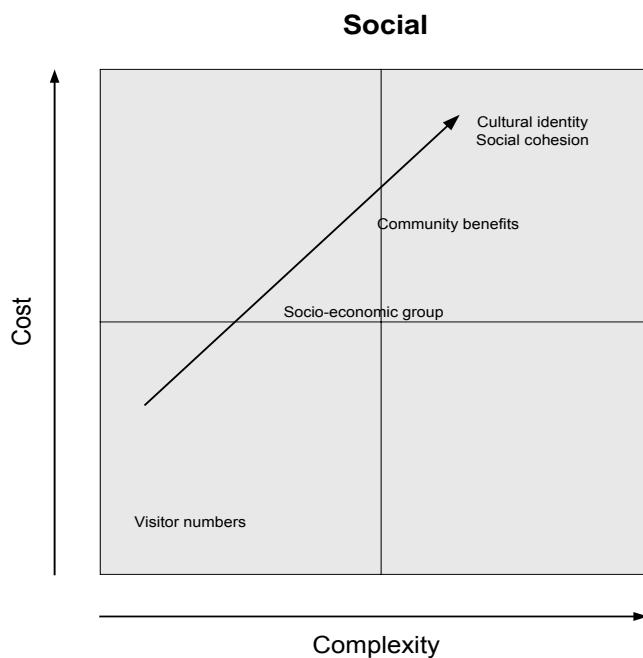


Figure 18: A cost complexity-matrix highlighting the position of various social auditing, valuation and impact methodologies.

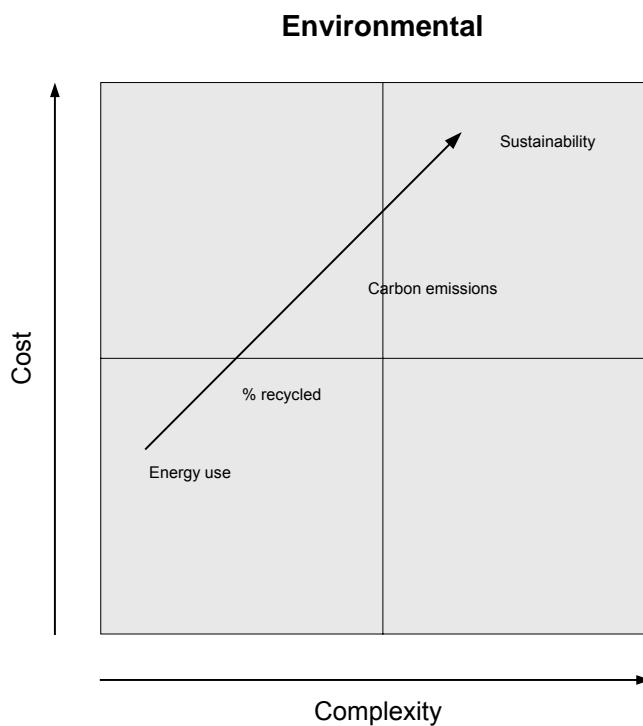


Figure 19: A cost complexity-matrix highlighting the position of various environmental impacts and outcome assessment methodologies.

The heritage impact model developed gives sites the opportunity to study impact within the confines of cost and complexity. A training package has been developed that is assessable by all users. The new impact indicators and methods developed, such as the local economy impact measure described earlier, also highlight the potential for reducing cost complexity for heritage site managers. Without such research

the burden of impact studies will divert critical resources away from core business processes at heritage sites, or impact will simply be ignored.

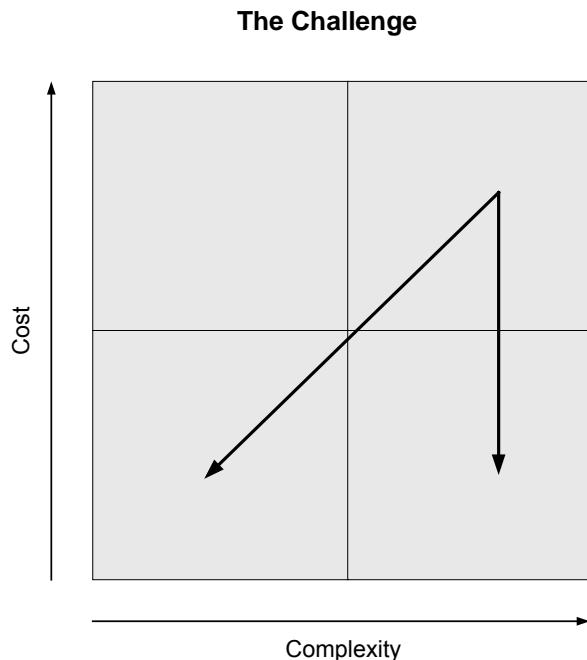


Figure 20: The challenge for reducing cost and complexity in socio-economic impact studies.

1.12 Conclusions

The Heritage Impact Toolkit is a strategic measurement and management system, which, when incorporated into the daily running of a heritage site, can act as a tool for conceptualising and tracking the outputs, outcomes, and impacts of multiple stakeholders within an organisation. Understanding and measuring a site's performance will help heritage organisations to articulate multiple bottom lines (individual, economic, social, environmental outcomes). There are a number of uses for this model:

- Such a holistic approach will provide a useful basis from which heritage managers can conceptualise socio-economic impact.
- If managers can begin to see how various elements come together to influence impact they can increase their understanding of heritage impact and this could form the platform from which site managers can influence positive outcomes.
- By looking at sites using the same criteria the models allow managers to compare sites.

Using the Heritage Impact Training toolkit will help make an organisation more robust, more transparent and more effective. In conclusion this is a tool that allows managers to understand their site, select and measure impacts, and create better business processes as a result.

References

- Arnold, D. and Geser, G. (2007) *Research agenda for the applications of ICT to cultural heritage*. Archaeolingua: Budapest.

Geser, G. (2004) Assessing the readiness of small heritage institutions for e-culture technologies. *DigiCULT.Info* 9, November 2004, 8–13. <http://www.digicult.info/pages/newsletter.php>

Johnson, G., Scholes, K., and Whittington, R. (2006) *Exploring corporate strategy*, FT Prentice Hall: London.

McLoughlin, J., Kaminski, J. and Sodagar, B. (2007) Assessing residents values for the Royal Pavilion using contingent valuation, in McLoughlin, J., Kaminski, J. and Sodagar, B. (eds.) *Perspectives on impact, technology and strategic management*. Heritage management series volume 1. Archaeolingua: Budapest, 77–86.

McLoughlin, J., Sodagar, B. and Kaminski, J. (2006) Dynamic socio-economic impact: A holistic analytical framework for cultural heritage sites, in McLoughlin, J., Kaminski, J. and Sodagar, B. (eds.) *Heritage Impact 2005: Proceedings of the first international symposium on the socio-economic impact of cultural heritage*. Archaeolingua: Budapest, 43–57.

Mignosa, A. and Rizzo, R. (2004) Heritage and information, in Cain, K., Chrysanthou, Y., Niccolucci, F., Pletinckx and Sberman, N. (eds.) *Interdisciplinarity or the best of both worlds – the grand challenge for cultural heritage informatics in the 21st century*, Selected papers from VAST 2004, Archaeolinguia: Budapest.

Rizzo, R and Mignosa, A. (2006) Policy decisions and cultural heritage impact, in McLoughlin, J., Kaminski, J. and Sodagar, B. (eds.) *Heritage Impact 2005: proceedings of the first international symposium on the socio-economic impact of cultural heritage*, Archaeolingua: Budapest, 58–68.

Social Enterprise London (2006) *The PM Toolkit*, SEL: London.

The Outspan Group (1999) *Socio-economic benefits framework: cultural sector*. Department of Canadian Heritage discussion paper. The Outspan Group: Amherst Island.

2 Understanding the socio-economic impact of ICT at heritage sites

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The following methodological model can be used as a platform for the study of the impact of information and communications technologies (ICT) at cultural heritage sites. The model has been developed through extensive, in-depth interviews with curators, directors and stakeholders at many cultural heritage sites across Europe. The underlying strength of this model is its versatility. Although the model is oriented towards the investment in, and deployment of, ICT at heritage sites it is fundamentally about understanding the process of investment and so could be modified for many investment decisions.

2.1 Introduction

The holistic heritage site-level model shown in Chapter 1 provides a wider context to understand the impacts and outcomes associated with cultural heritage sites. The impact of an ICT deployment on heritage sites and their visitors is an *incremental* impact. That is to say it is an impact that occurs in addition to, and as part of, the wider impact of the site. Therefore, any changes to the dynamics of the site could affect the impact that an ICT deployment has.

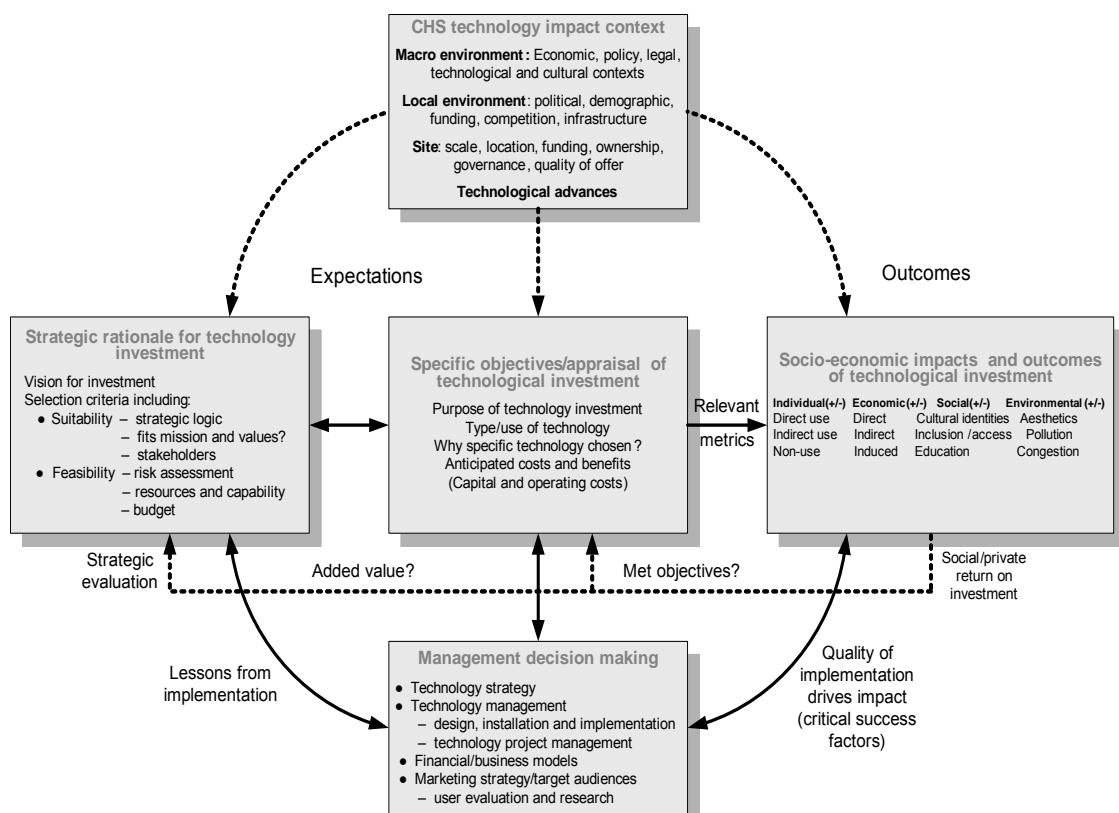


Figure 21: A holistic investment contingency model for technology impact evaluation at cultural heritage sites.⁸

⁸ See also McLoughlin *et al.* (2007)

ICT does not exist in a vacuum divorced from the heritage system. ICT is part of that system. The incremental impact of an ICT deployment cannot be viewed in isolation from the non-ICT impacts and outcomes associated with a particular heritage site. The success or failure of a particular ICT project is, more often than not, a function of factors outside of the realm of IT. Politics, design, and location amongst others play an important role in the success and failure of an ICT deployment. The success or failure of a project determines its socio-economic impact as much as the technology itself. It would be a gross simplification to think that technologies can be studied in isolation from these external factors. This is why the first model that has been developed (the Heritage Impact Training model) seeks to understand and conceptualise the dynamics of the heritage site being studied. This model provides a site ‘context’ for the following model which is specifically oriented towards the deployment of ICT (see Figure 21).

Also, when studying the ‘impact of technology’ it becomes apparent that any analysis is meaningless without consideration of what makes each site unique. Different sites have different strengths and weaknesses – strong brands, exceptional collections, extensive financial resources, etc. Different sites also have different rationales and objectives for deployment. If the ‘impact’ of ICT is divorced from these contextual factors then the result of any analysis can lose its full potential. This is why the model is so essential. It allows those studying sites to place them in the same conceptual framework (McLoughlin *et al.* 2006a, 2006b).

This research is based not only on examples of ‘best practice’ but the analysis of examples of failure. As much, or more, information can be derived from examples of technology failure as from examples of success.⁹

2.1.1 The technology impact context

Changes to the non-technology elements of the heritage site and its wider context can have wide-ranging effects on the impact and outcomes of an ICT deployment. Considerable resources are devoted in the holistic site model toward determining the wider impact context that a heritage site exists in. The information derived from the holistic site model can be applied to this element of the ICT model. In this element the ‘macro technological’ context is also studied in order to establish how this affects the deployment of ICT. A number of factors affect the technological impact context, including:

- *Development of ICTs*: The ICT deployment in heritage sites exists within a wider ‘ICT and technology’ context. At the most fundamental level, what ICT is available is dictated by developments in the spheres of science, industry and commerce. Heritage sites do not have the resources or expertise to drive change in ICT. But the availability of ICT is the principal determinant of what can be achieved.
- *Cost of technology*: Global economic forces have acted to drive down the price of ICT hardware and software. This contextual factor affects both heritage sites and their visitors:
 - Lower costs have made ICT technology more accessible to heritage sites which do not tend to have buoyant finances (the increasing use of audio guides, projectors, touch-screens and large LCD screens at heritage sites is an obvious manifestation of this).
 - ICT has become a commodity item in society. As more consumers have the opportunity to have increasingly sophisticated ICT in their homes, more people are becoming familiar with technology. Furthermore, many visitors will have access to technology in their workplaces. Visitors are therefore becoming increasingly familiar with ICT and so the accessibility has increased. This can also lead to increased acceptance of technology (see below). The visiting public are driving demand.

⁹ Of course, examples of failure are more difficult to acquire because those involved are less likely to want the information disseminated because it could reflect badly on them or their organisation. In contrast, examples of success are widely disseminated in the literature, at conferences, etc.

- *The acceptance of technology:* The acceptance of technology is determined by socio-economic factors. The widespread use of ICT is the result of complex interactions between economic forces and user needs. Acceptance of such technology is often dictated by the penetration of ICTs in society (the internet, digital TV, mobile phones, PDAs). Acceptance of technology is relevant to both the site visitors and the site interpreters.
- *Reliance on existing technology solutions:* Some ICT technologies and standards are well established (the Internet, PC hardware, HTML, XML, etc.), but others are still in the process of gaining market acceptance. Sites with potential ICT deployments that rely on cutting edge/bleeding edge technologies/standards could run the risk of the technologies used failing to gain long-term market success; however, if successful, these sites could have a market leading advantage. Deploying technological solutions at the appropriate time is crucial.

2.1.2 Strategic rationale for technology investment

There has to be a strategic rationale for technology investment. This is usually closely linked to the mission and vision for the site. Strategy needs to underpin the management decision making at a heritage site. Two principal components are suitability and feasibility:

Vision

Vision for investment: All investment decisions usually involve some intended innovation to enhance the cultural product offer. The vision is eventually a strategic view of where the site should be and what it should offer. Once this is clearly defined the exploration of the appropriate ICT for the vision can take place (e.g. see section 4.2.3 in this volume).

Suitability

- *Strategic logic:* There must be a strategic logic for the deployment of ICT. At its simplest a heritage site's strategy revolves around three questions: Where is the site positioned now? Where does it want to be positioned? How will it achieve that goal? An ICT-based solution may, or may not, be the most effective use of resources for achieving that goal (see Figure 22). There have been many examples of technology-led solutions that have been deployed at heritage sites for no other reason than the technology was available.
- *Site mission:* Another key question is does the particular use of ICT fit with the mission and values of the site? It is crucial that the deployment fits the mission and values of the site. For example, the type of ICT deployed at a site whose primary aim is education might differ from one where visitor numbers are required to support the revenue stream.
- *Stakeholders:* All investments involve opportunity costs. The potential funds that may be devoted to an ICT project can have alternative uses. It is therefore essential that stakeholders support the deployment of resources.

Feasibility

- *Risk assessment:* The installation of ICT can hold considerable risk for heritage sites. For many it is an area beyond their traditional sphere of experience so they are reliant upon external sources of consultancy and services. A typical risk factor is cost outweighing the benefits.
- *Budget:* Sites have to consider if they have the budget for ICT installation and maintenance and/or the resources and capability to support such an installation.
- *Resources and capability:* The introduction of ICT requires numerous new skills. Heritage sites need to establish what resources and capabilities they have for such a deployment. Do they have any skills

in-house or will the entire project (or part of the project) need to be outsourced? Furthermore, ICT requires maintenance. Hardware which requires a high level of manual interaction such as touch-screens, trackballs, and keyboards all require upkeep. Purely electronic hardware such as processors, motherboard batteries, disk drives can all fail. Also, hardware can be broken or stolen. Bespoke software may have bugs. Sites have to allow for these contingencies and set aside resources at the outset for maintenance.

2.1.3 Management decision making

The management decision-making element is another key component that influences impact. There are three components within this element: technology management, the financial and business models, and the marketing strategy.

Technology strategy

Cultural heritage sites should have a continuous review of technology strategy (e.g. Web strategy) that can support the cultural offer.

Technology management

Technology management is a multi-faceted area:

- *Technology project management*: There are numerous considerations to be made when managing a technology project. For example does the project meet the heritage site's vision? Is there a clear objective? As Soren (2005: 143) notes, "clear objectives and values help curators take ownership of a project, and feel responsible for whether it succeeds or fails." It is necessary to liaise with external partners and with internal players (i.e. using human resource management for managing change). Not all heritage sites have the luxury of having full-time staff devoted to ICT management. Some have to share IT staff between sites or have staff that do IT-related tasks in addition to other jobs. These sites may have to purchase these skills from outside consultants. If the heritage site is for some reason unable or unwilling to maintain their ICT deployment then its impact may change from a positive to a negative. Furthermore, deploying ICT at a heritage site is not the end of the story. Information technology, as with all technology, requires maintenance. Many sites do not have the skills to keep ICT projects running if the technology breaks down. This of course then requires external consultancy to fix any problems – but needs to be factored into the running costs of the original business and sustainability model. The following factors are also integral with technology management:
 - *Management 'buy-in'*: Much work has been conducted in the commercial business sector that shows that the lack of senior management buy-in is one of the biggest reasons for the failure of technology projects. This is extremely important in the cultural heritage sector because there can still be reticence towards the use of information technology in what is still a sector with traditional origins. Without management buy-in projects could fail before deployment or could have insufficient resources for successful deployment, leading to negative impressions by visitors.
 - *Leadership*: Closely related to the above is leadership. Leadership for an ICT deployment at a heritage site exists at two levels: the strategic leadership that drives the overall conceptualisation, and the IT project leadership that manages the actual day-to-day running of the project. Strong strategic and project leadership can greatly enhance its chances of success.
 - *Design, installation, and implementation*: When visitors come face-to-face with front-of-house ICT at heritage sites their first impression is a function of the design, implementation, and installation of the technology. The design of ICT applications is a complex area that is usually beyond the experience of heritage site personnel because so many different skill-sets are

required (ICT development, graphic design, ergonomics, etc). As heritage sites have become more likely to deploy ICT to enhance the visitor experience a market opportunity has been created for organisations who design and install ICT solutions (and those who co-ordinate the various project specialists). Although, even today few enterprises can rely solely on the heritage sector for their business. Still heritage sites deploying ICT are now making a contribution to the business sector.

- *The quality of the implementation drives the potential impacts:* An exceptional use of technology can be let down by poor design, location, and implementation. Alternatively, lack of funding may result in poor design because shortcuts were made. This is important because considerable evidence points to cultural tourists as being increasingly sophisticated visitors. This does not imply that all visitors to heritage sites are classified as cultural tourists, but there is a tendency for museum and heritage site visitors to come from higher education backgrounds.

Financial and business models

- *Financial/business models:* In the past many heritage sites have been caught out by the lack of coherent, sustainable business models. Capital funds and grants have been devoted to projects but less consideration has been devoted to the sustainability of the project. There is evidence that this is slowly beginning to change – many funding bodies now require evidence of sustainability and business planning before they grant capital funds to projects. For example, in the UK funders such as the Heritage Lottery Fund and English Heritage now require sustainability plans for the projects they fund. There are numerous considerations for financial and business models, such as charging for specific exhibitions, developing exhibitions with the potential to tour and so gain extra revenue, or more imaginative models such as sharing development costs in return for a percentage of the revenue.

Marketing strategy and target audiences

- *Marketing strategy:* ICT deployments do not exist outside of a business system. If visitors are not motivated to go to the physical or virtual heritage site in the first place then the impact of the ICT deployments can be reduced. A significant investment in ICT might form the basis of a marketing campaign. This certainly increased the awareness and therefore had a considerable influence on the scale of the impacts and outcomes.
- *User evaluation and research:* Heritage sites have a long tradition of conducting research on their visitors to determine user satisfaction. Visitor surveys or interviews are well understood by heritage sites. There is also considerable external consultancy available to sites.¹⁰ There is therefore a well-established mechanism that heritage sites can use to determine the socio-economic impact of technology at heritage sites. Furthermore, user evaluation can be used to support marketing research.

2.1.4 Specific objectives and appraisal of the technology investment

Purpose of technology investment: This is fundamental for understanding the impact of ICT. ICT investment reflects cultural product innovation and can provide a basis for a ‘new offer’. There can be a wide range of reasons for the deployment of visitor-facing ICT at heritage sites. These can include:

- Enhancing the user’s experience
- Increasing visitor numbers

¹⁰ Although, to date very few sites have targeted the incremental contribution to the user/visitor experience caused by the use of ICT.

- Increasing accessibility
- Enhancing educational impact, or
- Some combination of the above.

A key question that sites often want answered is, “Has the investment achieved this aim?” The objectives of a project are key to determining what impacts should be assessed.

- *Type/use of technology:* The purpose for a technology investment is a key determinant for why a specific technology is chosen. This of course is tempered by the anticipated costs and benefits of such a deployment. The type of technology chosen is crucial for impact assessment. Different technologies have different potentials for impacts and outcomes. Technology that is connected to the internet may have a greater impact because of the potential for access to a larger number of people. Site-based visualisations may have a considerable impact to the visitors, but this may not be translated to a broader impact because of the localised nature of the impact.
- *Anticipated costs and benefits:* This is the essence of appraisal. The initial capital cost outlay can be estimated as can the potential social returns and benefits. The anticipated costs may be assessed through the use of Return On Investment (ROI), and Net Present Value (NPV) calculations. It is essential to consider both the capital and operating costs for a deployment. These assessments can then be compared with the potential anticipated benefits that the use of ICT may entail. Once a project is running the impact measures can be used to provide data on the actual return.

2.2 The strategic context for effective deployment of technology

Strategic decision making and effective implementation drives a heritage organisation to achieve its mission, objectives, and its desired impacts. The following conceptualisation of the model shows how the three elements of heritage site strategy are encapsulated within the model – leading to the creation of a heritage strategy triangle (see Figure 22).

- The ‘site impact context’ provides information on where the site is currently positioned.
- The ‘strategic rationale for the investment’ in technology is the key indicator of what the site wants to achieve.
- The objectives and the management decision-making are the areas where sites can work on achieving their goals.
- In this strategic context the socio-economic impacts and outcomes validate the strategic decision-making framework for the heritage site. These impacts can be used to verify if the objectives of a strategic change have been met. They are an integral part of a holistic management information system that can be used to determine which strategies work and which do not in the heritage site context.

2.3 Conclusions

The above model highlights the limitations of assuming a simplistic relationship between deploying technology and its impact. It is apparent that many factors influence social and economic impacts simultaneously with any technology impacts. The breakdown of the model into elements allows users to conceptualise the process of investment. This way of thinking could be called ‘heritage systems analysis’. This is to say, a consistent theoretical model for heritage sites that allows the internal and external factors that influence impact to be conceptualised. If the heritage sector were to understand how

various components of the system are interlinked and affect impacts and outcomes then this could become the basis for *understanding* impact. In this context understanding impact becomes the basis for positively *influencing* impact.

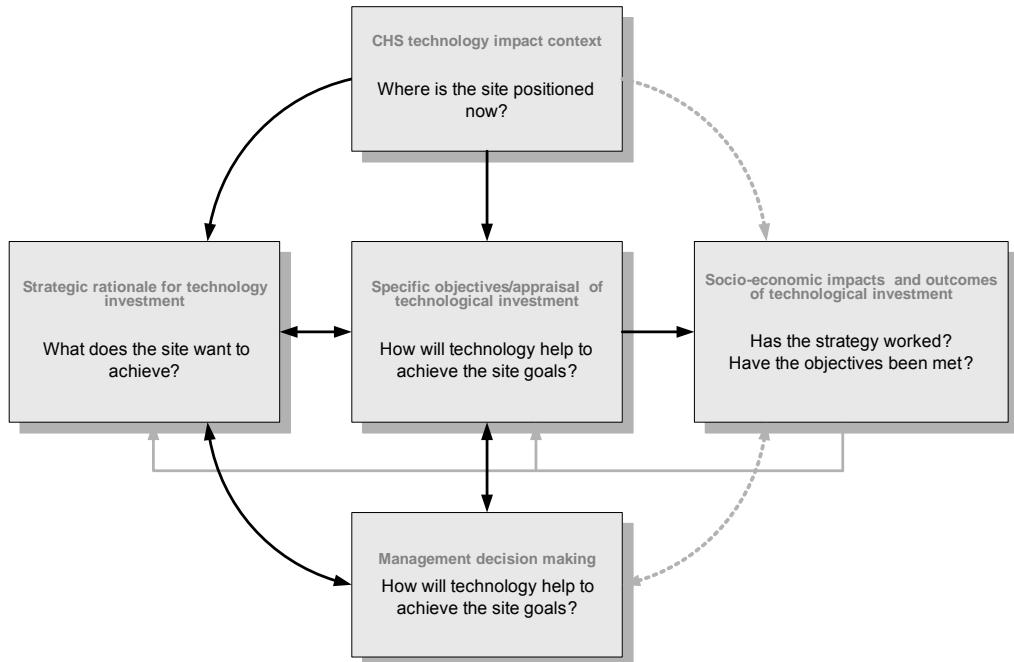


Figure 22: The 'strategy triangle' in the holistic ICT decision-making model.

The underlying strength of this model is its versatility. Although the model is oriented towards the investment in, and deployment of, ICT at heritage sites it could be modified for many investment decisions.

References

- McLoughlin, J., Sodagar, B. and Kaminski, J. (2006a) Dynamic socio-economic impact: A holistic analytical framework for cultural heritage sites, in McLoughlin, J., Kaminski, J. and Sodagar, B. (eds.) *Heritage Impact 2005: Proceedings of the first international symposium on the socio-economic impact of cultural heritage*. Archaeolingua: Budapest, 43–57.
- McLoughlin, J., Kaminski, J. and Sodagar, B. (2006b) ICT investment considerations and their influence on the socio-economic impact of heritage sites. *VAST 2006 proceedings*, Eurographics/ACM. 109–16.
- McLoughlin, J., Kaminski, J. and Sodagar, B. (2007) Modelling ICT deployment at heritage sites: A mechanism for impact assessment, in Trant, J. and Bearman, D. (eds.) *International Cultural Heritage Informatics Meeting (ICHIM07): Proceedings*, Archives and Museum Informatics: Toronto <http://www.archimuse.com/ichim07/papers/mcloughlin/mcloughlin.html>
- Soren, B. J. (2005) Best practices in creating quality online experiences for museum users. *Museum management and curatorship* 20, 131–148.

3 Modelling the impact of technology on the heritage sector: Conceptualisation, implementation, and measurement

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This chapter is based on a practical application of the holistic technology investment model that allows heritage managers to conceptualise how ICT deployment influences socio-economic impact. The model provides the framework to understand the deployment of audio guides at the Royal Pavilion Palace, Brighton. The use of audio guides at heritage sites is becoming increasingly common and since it is well-established technology, represents low risk for heritage sites. Special emphasis is placed on the strategic rationale behind the introduction and considers how these decisions affected the impacts and outcomes associated with the deployment. The analysis highlights the importance of organisational change occurring as a result of the deployment and the business model adopted.

3.1 Introduction

This chapter provides a practical application of the holistic technology investment model shown in Chapter 2 of this volume, which allows heritage managers to conceptualise how ICT deployment influences socio-economic impact. The model provides the framework to understand the deployment of audio guides at the Royal Pavilion Palace, Brighton. The deployment of audio guides at heritage sites is becoming increasingly common. The technology is well established so represents a low risk for sites considering using such devices. The following chapter considers the deployment of audio guides at the Royal Pavilion Palace, Brighton. Special emphasis is placed on the strategic rationale behind the introduction and considers how these decisions affected the impacts and outcomes associated with the deployment.



Figure 23: John Roosevelt using an early portable reel-to-reel tape player-based audio tour.

Audio guides can trace their history back to the 1950s, when ‘portable’ reel-to-reel tape players were used to provide linear audio tours (early adopters of audio guides included sites such as Eleanor Roosevelt’s Hyde Park home and the Phoenix Museum of Art). During the 1960s portable tape cassette players were modified to form the basis of audio tours. By the 1970s the first devices incorporating radio frequency and infrared were deployed. In the 1990s the reduction in the cost of computer memory caused the introduction of increasing numbers of digital devices at the expense of analogue systems.

Audio guides or audio tours present a recorded commentary to visitors at heritage sites or other attractions, usually through the use of a handheld device. Currently in most audio guides used at heritage sites the audio commentaries are accessed by the visitor inputting a number that corresponds to the room or exhibit that they are viewing.¹¹ The commentaries provide users with access to contextual and background information about the artefacts being viewed. This allows visitors to engage flexibly with the exhibits. Certainly, the medium allows the visitor to spend more time looking at the exhibits and surroundings than if they were reading from a guidebook or information panels. It also means that historic interiors or exhibits are not cluttered with information boards. Such random access audio guides increase flexibility and interpretive content because they allow for information ‘layering’ (users have the flexibility to access additional tracks as they prefer). As such a single guide may meet the needs of different groups of visitors.

This random access is essentially the audio equivalent of hyper linking on the internet. Although PDAs are beginning to be deployed at heritage sites to provide a multimedia experience for such tours, they are rare compared with analogue and digital audio guides. This is because heritage sites tend to be late adopters of technology (usually because of funding limitations).

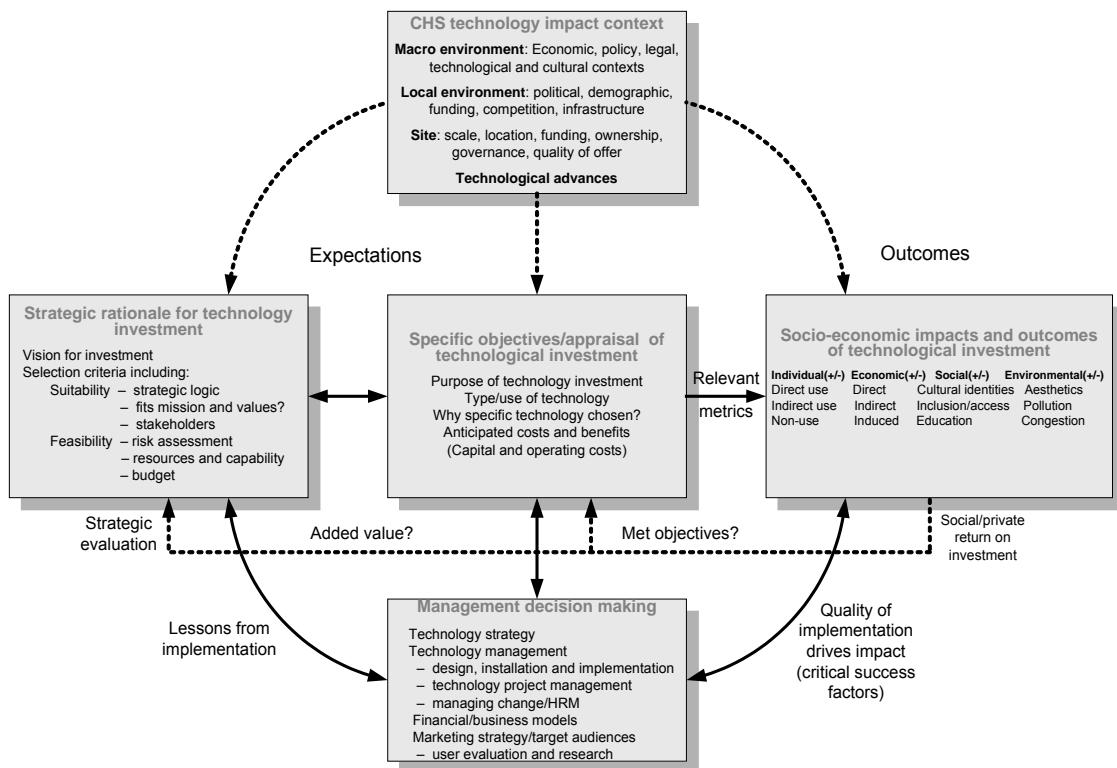


Figure 24: The holistic ICT investment framework.¹²

¹¹ In addition to the manual entry of location data a number of automated trigger mechanisms have been developed to access audio tracks when visitors pass specific rooms, exhibits or artefacts. These mechanisms include radio (e.g. wireless networks and Bluetooth), infrared signals, and GPS. This obviously requires a more complex technological framework to support it.

¹² After McLoughlin, Kaminski, and Sodagar (2006: 113)

Audio guides are becoming increasingly popular as an interpretive mechanism at heritage sites, although their deployment is not consistent across Europe. They are relatively common in Northern Europe and often at major national heritage attractions across Europe. But there is a disparity between general take up in northern Europe and southern Europe, and the new accession countries, which have a very low deployment rate.

On April 26, 2006 the Royal Pavilion, Brighton, deployed audio guides using funding obtained after an independent disability audit highlighted the need. The audio guides are now available to all users as part of the entrance fee. The service is designed to complement information provided by the staff, guidebooks and guided group tours already available in the Royal Pavilion. The holistic ICT investment framework (see Chapter 2) was used as a basis for evaluating the investment decisions and impacts (see Figure 24).

3.2 Heritage site technology impact context

The introduction of the audio guides was prompted by a number of contextual factors (see Figure 25). These were:

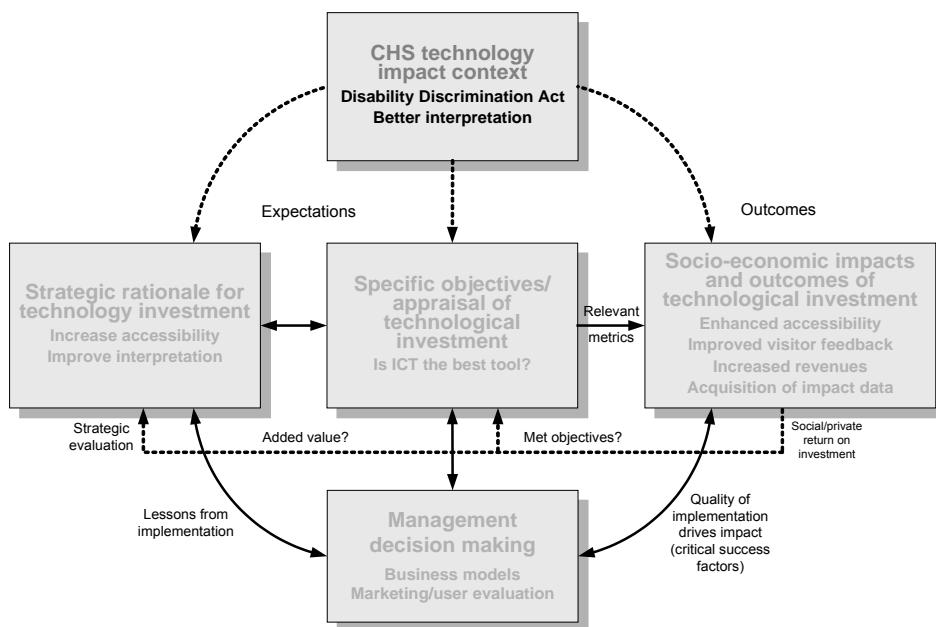


Figure 25: The technology impact context for the deployment of audio guides at the Royal Pavilion Palace, Brighton.

- *Disability Discrimination Act:* In the United Kingdom the Disability Discrimination Act (DDA 1995) required institutions to “change practices, policies or procedures which make it impossible or unreasonably difficult for disabled people to use a service.” The Act’s requirements to make reasonable adjustments were introduced in stages, the initial phase covering policies, practices, and procedures (e.g. ‘no dogs’ policies), and auxiliary aids (e.g. large print information or Braille), and the provision of an alternative means of service where a physical barrier prevented use of the service came into force in October 1999. The remaining duties came into force in October 2004, such as removing, or providing a reasonable means of avoiding, a physical barrier. Heritage sites had therefore to make reasonable changes to provide accessibility for the disabled. An independent disability audit was conducted in 2003 highlighting that audio guides were just such a mechanism for improving the service to the blind, partially sighted and those with poor reading skills.
- *Visitor demand:* Furthermore, analysis of visitor feedback comments revealed that there were consistent requests for “better interpretation”. The combination of the two needs of Disability

Discrimination Act policy and improvements to visitor interpretation led the investment decision towards the use of audio guides. Audio guides represented one method that could achieve both these goals: improve access for the disabled and improve the interpretation. Therefore, the deployment of audio guides was driven by policy requirements and visitor demand. Importantly, it was not a case of using technology for technology's sake.

3.3 Strategic rationale for technology investment

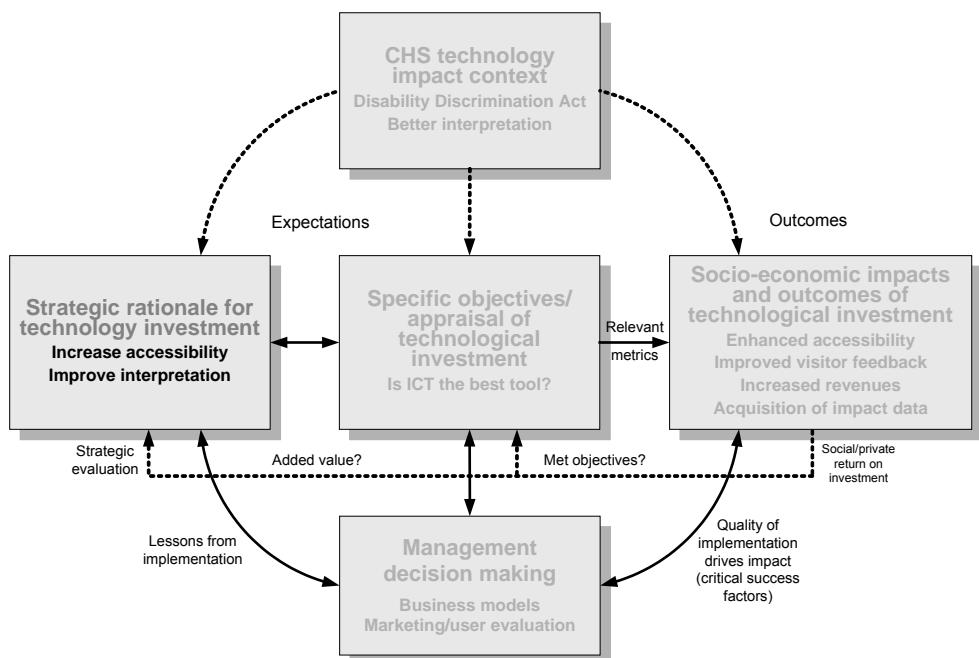


Figure 26: The strategic rationale for technology investment in audio guides at the Royal Pavilion Palace, Brighton.

The strategic rationale (see Figure 26) for the investment in audio guide technology was therefore oriented towards improving the quality of the offer, which would be achieved through:

- *Better interpretation*: Traditional interpretation at museums and heritage sites is achieved through the use of text-based information panels. Of course, the amount of text that can be displayed on text panels is limited. Also, the 'reading level' of the text affects the amount of information that can be conveyed. The use of audio guides allows multiple levels of interpretation to take place. For example, at the Pavilion the standard interpretation for each room is supplemented by the option to access information in more depth on specific objects or events that happened in the rooms. This 'information layering' provides a dual role, basic information for all visitors and more in-depth interpretation for those who are interested (see 4.3.2).
- *Accessibility*: The use of audio guides increases the number of people who can properly participate in the experience of the site. Audio guides have the potential to improve access for three broad groups of people in particular: the disabled/those with learning disabilities, those with reading difficulties, and non-English speakers.
 - *Disabled visitors*: Improving access for disabled visitors is complex.¹³ Blind or partially sighted visitors would benefit from the use of audio-guides (other mechanisms include Braille or moon language). The guides have the potential to allow the blind to conduct visits that

¹³ Audio guides should be seen as only part of a suite of measures that are needed to improve access for blind or partially-sighted visitors.

are not necessarily reliant on heritage site staff, the audio guides do not need to be booked in advance and are available all the time, unlike heritage site staff who can be conducting a tour, and they provide a consistent high level of interpretative information. Those with learning disabilities could benefit from symbol languages such as widget. However, audio guides have the potential to help all these disparate groups. Of course, visitors do not need to be disabled to benefit from the devices. Those with reading difficulties and those who require literacy support for other reasons can also benefit.

- *Non-English speaking visitors:* Another group who can benefit from the introduction of audio guides is those whose knowledge of the local language is poor.
 - In the case of the Pavilion this can include those who are non-English speaking (and have audio content created for their language),¹⁴ or
 - Those whose reading knowledge of English is poor (who can either be from abroad or whose reading level is low for whatever reason).

These groups now have the potential to get increased value from the site.

3.4 Specific objectives and appraisal of the technological investment

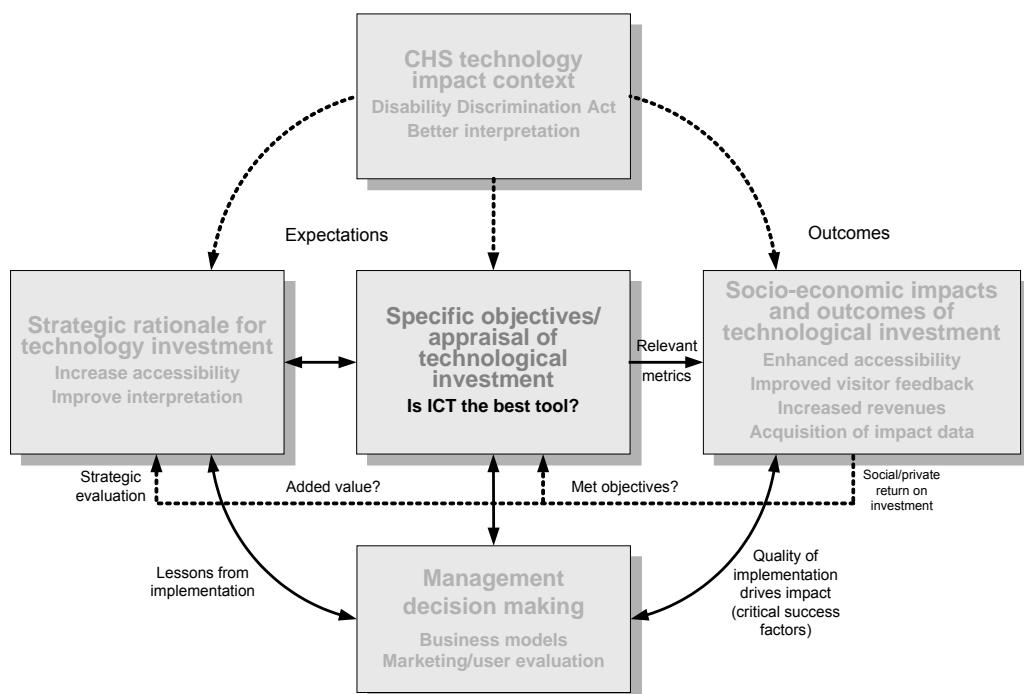


Figure 27: The specific objectives and appraisal of the investment in audio guides at the Royal Pavilion Palace, Brighton.

Audio guides fulfil all the requirements defined in the strategic rationale for investment. Audio guides are a well-established technology. There no major limitations to their use. Of all the potential ICT-based technologies available audio guides have very few if any limitations in their deployment, which reduces

¹⁴ Content was initially created in English, French, Spanish, and German; these were followed by Spanish and Italian. Over time it is planned to develop the audio guides into an additional twelve languages or formats. A wand tour is also available for people with a visual impairment.

the risk associated with the deployment. When investment decisions are being made at heritage sites risk is crucial. Because of the tight funding situation most heritage sites are unable to sustain financial losses. Careful consideration has to be given to alternative uses of the funding.

3.4.1 The impact on the staff

Technology evaluation tends to focus on the impact on the visitors and users. One area that is almost entirely missed is the impact on the staff. Because the introduction of audio guides (for all users) represents such a fundamental change to the operations of a heritage site the effects are found across the site at all staff levels.

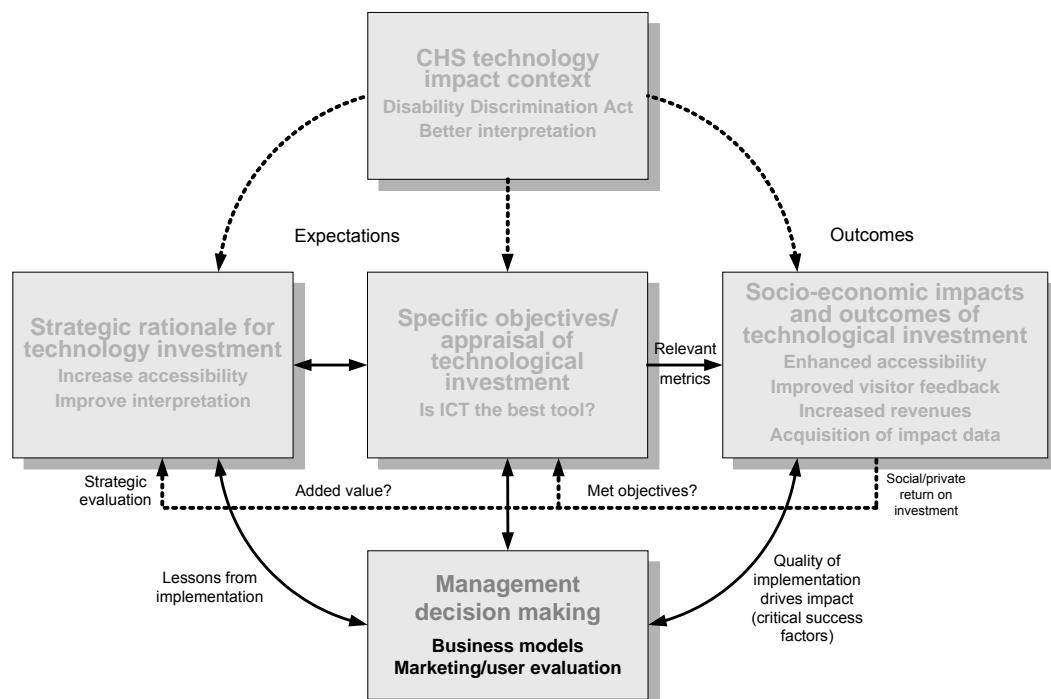


Figure 28: The management decision making behind the investment of audio guides at the Royal Pavilion Palace, Brighton.

- *Employment:* Information technology is a means of increasing the efficiency of operations. As such there is the underlying potential for some applications to replace staff (for example audio guides can replace the need for human guides). In the case of Brighton Pavilion a deliberate policy was instituted to prevent the loss of staff guides because of the introduction of audio guides. This is certainly an example of best practice, but it must be assumed that not all sites will be able to afford the introduction of audio guides and to retain all guides. In these cases the impact could be superficially positive for the financial bottom line of the organisation, but negative from a social and a local economic perspective. In Brighton the introduction of audio guides was perceived as beneficial by some guides. Rather than having to conduct the same ‘standard’ tours of the building on a daily basis they could create specialist tours of the site and other heritage properties owned by the council (such as ghost tours). This added variety to the working routine of guides, allowing them to research new topic areas and conduct specialist tours. It has given rise to a ‘two-tier’ system of guiding. Standard tours are provided principally through the use of audio guides whilst specialist tours are provided by the human guides. This is beneficial for the public, who have a choice of guide types.
- *Reduced social interaction:* It is well known that ICT applications have the potential to reduce social interaction at heritage sites. For example, interactive displays tend to break up groups into individual ‘users’ of the technology. Audio guides are no exception. It has long been observed that the noise levels at sites using audio guides are low because the users are intently listening to their own

individual commentaries. As such the interaction between members of groups is reduced.¹⁵ However, this phenomenon also has its implications for staff. Many heritage sites have ‘room stewards’ who monitor the activity in specific rooms to make sure that objects are not damaged. These stewards also take on a supplementary role of answering visitors’ questions about objects and artefacts, and this can be a rewarding part of their work life. At the Pavilion visitor interaction reduced considerably after the introduction of the audio guides. A valuable area of social interaction was lost and this reduced the job satisfaction of some stewards.

- *Increased demand on staff:* It has been noted that demands on staff time increased across the site, from the new roles required at the issue desk, to the carriage of the handsets from the set-down point in the shop to the docking stations at the front desk (see 3.4.8 below).

3.4.2 Audio guides and human guides

Consistency: Audio guides provide a consistent level of interpretation. For all their flexibility and advantages human guides cannot provide consistent levels of performance. Good and bad presentation days and illness can all reduce the quality of a tour; of course tours can be exceptional given the right mix of circumstances.

Flexibility: The content of audio guides can be updated, but there are cost implications, especially if the revised content has to be translated into many languages. The tendency is that content stagnates. Human guides can adapt their presentations at a moment’s notice to accommodate new discoveries, changes in interpretation, corrections, or specialist events and audiences.

	Audio guides	Human guides
Consistency	High	Moderate
Flexibility	Low/moderate	High
Cost	High/moderate	High

Table 3: A comparison of audio guides and human guides.

3.4.3 Business model

Audio guides are usually supported by two business models.

- *Optional use:* In this model basic access to the site does not include an audio guide. Visitors are given the option of choosing to use the handset or not. An additional fee is applied to those who wish to use the devices.
- *Obligatory use:* In this model the entry fee to the site is increased to cover the cost of the audio guides which are offered to all visitors.¹⁶

Another part of the business model is the ownership of the handsets; these can be leased or purchased. In the case of the Royal Pavilion the audio guide hardware was leased. This was a business decision to reduce the risk.

¹⁵ The type of audio guide used can have implications for the level of social interaction. There are two principal types used – audio guides using headphones and those using a ‘wand’-type device similar to a mobile phone. Headphones tend to be more immersive, while the wand devices allow the user to have one ear free and therefore more able to communicate with friends and family. A similar state can be achieved using ‘single-ear’ headphones. Of course, the general quiet that ensues because of the use of audio guides can intimidate visitors – further preventing interaction.

¹⁶ The obligatory use model only applies to sites who charge an entry fee. It should also be noted that more handsets will be required for the obligatory use model because all users whose languages are catered will require a handset. In contrast there will be a lower take up of devices in the ‘optional use’ model. This has implications for the initial cost of deployment.

- *Future proofing*: ICT advances at a considerable rate. The technology of audio guides is no exception, the current state of the art is moving toward PDA-oriented devices. If audio guide handsets were purchased outright they would quickly become obsolete, depreciate in value and incur long-term maintenance charges.
- *Maintenance*: All technology fails at some point. Solid-state digital audio devices are no exception. Broken or failed audio devices would need to be replaced by the Pavilion if they owned the handsets. The leasing option means that the handsets are automatically replaced if they break down.
- *Relationship building*: The leasing of the audio guides allows a much stronger relationship to be developed between the supplier and the heritage site than can be expected if the hardware was purchased.

3.4.3 Marketing and visitor data generation

The audio guides have the ability to generate basic outcome and impact data on two levels:

- *Usage statistics*: Simple usage statistics (cybermetrics) can be gathered from the handsets which can be used to determine how long visitors use the devices for, which particular commentaries are most widely listened to, etc. This data can be used for operational purposes.
- *Visitor questionnaires*: Possibly the most important addition function that some digital audio guide handsets have is the inclusion of simple exit questionnaires for the users. For a detailed analysis of the usage statistics from the Roman Baths in Bath, UK see Chapter 4.

Visitor questionnaires

Paper-based questionnaires have long been the mainstay of museums and heritage sites; however, these have become problematic for a number of reasons including:

- *Cost*: Paper and printing costs need to be considered – each questionnaire, whether used or not, has an incremental cost. This cost is often exacerbated by increasingly low visitor response rates for paper-based questionnaires.
- *Visitor response*: Visitors are becoming increasingly reticent about answering questionnaires. In many parts of Europe the excessive use of postal marketing questionnaires has turned public opinion against filling out questionnaires. Furthermore, the response rate for internet and e-mail questionnaires is also decreasing as users are overloaded with such surveys. Also, many questionnaires are left for visitors to fill out at the close of the exhibition/site; at this point visitors often exhibit ‘exit oriented’ behaviour. Many visitors are also reticent about giving out personal information. Response rates can be limited by factors as simple as the availability of pens and a flat surface to write on. It has become evident in the last decade that better results are obtained from having researchers conducting face-to-face questioning. Obviously, this incurs a much higher cost. However, data from the deployment of audio guides at the Royal Pavilion has shown that the response rate from the audio guide handset questionnaires is far higher than from the traditional paper questionnaires. A number of reasons can be posited for this.
 - *Easy to use*: Unlike a paper questionnaire the visitor does not need to do anything extra to answer the questionnaire (no need to find a pen or place to write). The questionnaire is generated as soon as the tour is at an end, and because the visitors have had the opportunity to become familiar with the use and functionality of the device during the tour there is little additional input required.
 - *Security*: Visitors perceive the handsets to be a secure medium to provide low-level personal information. There is no chance of any personal information being left lying round.

- *Novelty*: It could be that there is a novelty issue associated with filling out a questionnaire on a portable device.
- *Cost*: Once the cost of producing the e-questionnaire is incurred all subsequent uses are free, there is no incremental cost. Furthermore, costs are reduced in the analysis of the data. Because the visitor data is ‘born digital’ its initial analysis can be automated. This is crucial; often visitor questionnaires are left un-analysed at heritage sites because there are often insufficient qualified staff resources to conduct the research. The conversion of written questionnaire data to electronic form is very time consuming and can be prone to error. Automated analysis, therefore, reduces the time, errors, and financial resources required to gain marketing information and impact data from questionnaires.
- *Limitations*: By necessity the questionnaires deployed on audio guide handsets have to be short and inevitably simple (answers are limited). However, even these limited questions can be used as the basis for some comparatively sophisticated analyses (for example, estimates of the contribution of the site to the local visitor economy).

3.4.5 Impacts and outcomes

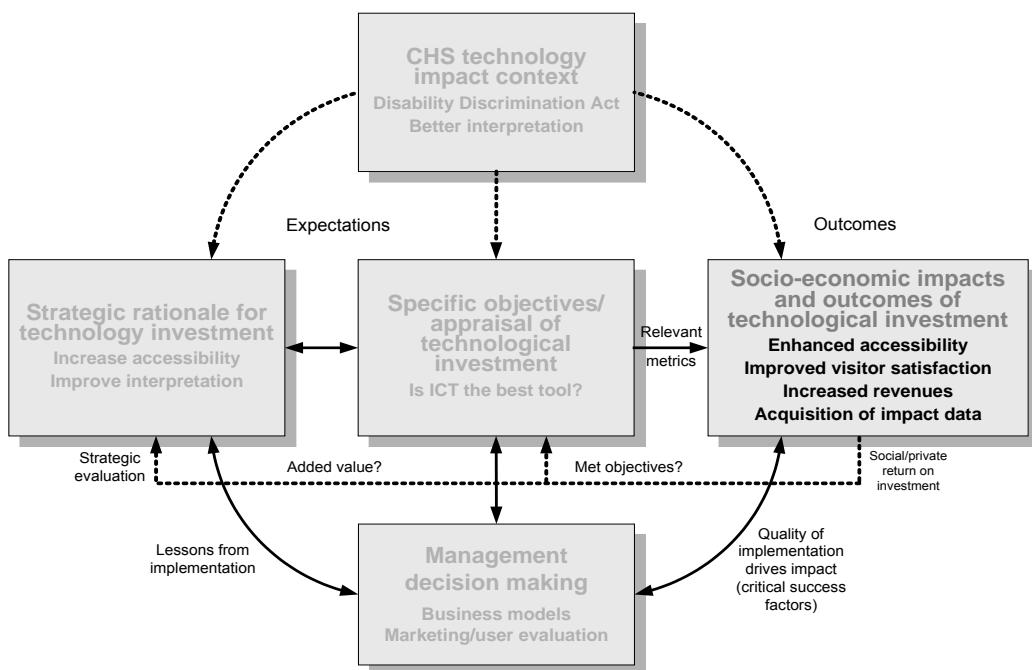


Figure 29: The socio-economic impacts and outcomes associated with the investment in audio guides at the Royal Pavilion Palace, Brighton.

3.4.6 Individual impacts

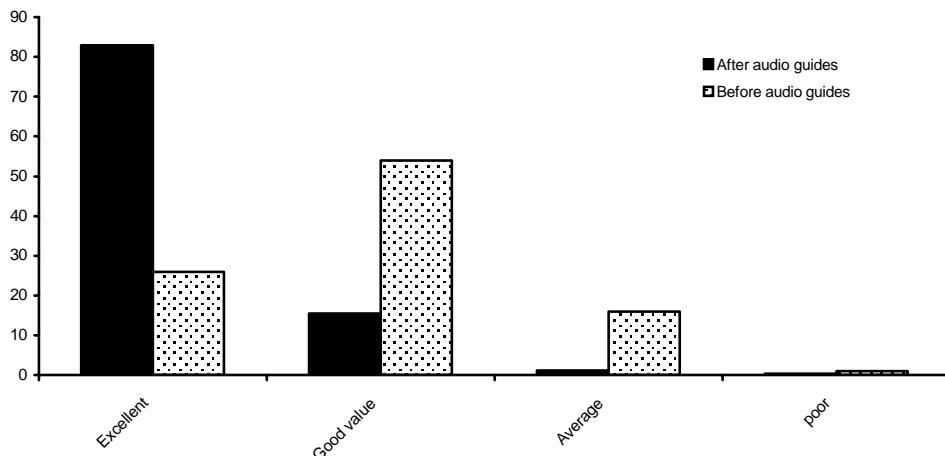


Figure 30: Visitor responses to the question “How much value for money does the Royal Pavilion provide?” before the introduction of audio guides and after.

User satisfaction: The higher response rate from the audio handsets compared with paper, e-mail or internet questionnaires (all of which are dropping off to almost meaningless levels), is important because the responses can provide key marketing information that can help guide the strategy of the organisation.

It is evident from the handset questionnaire responses (see Figure 30) that users are increasingly satisfied with the interpretation provided by the Royal Pavilion. A comparison of the responses from questionnaires conducted before the introduction of audio guides (2004) and after (2006) clearly shows the changes in perception. This in conjunction with interviews with visitors suggests a causal link. Increases in user satisfaction have also been seen after audio guide deployment at other sites, such as the Roman Baths, in Bath.

3.4.7 Economic impacts

A number of economic impacts were encountered:

- *Café revenue:* The audio guide provides an opportunity to inform visitors about the location of other services at the site such as the shop, café, and toilets. The simple strategy of including the café on the Royal Pavilion audio tour increased its revenue. Some of this may have been due to the poor signposting of the café prior to the audio guides; however, the development of the tour has put the site in the mainstream of the Pavilion and focused operational and strategic thought during the development of the audio tour.
- *Retail income:* There is limited evidence to suggest that retail income at the Pavilion shop may have increased.¹⁷ Although there are issues behind suggesting causality between the deployment of audio guides and increased revenue, there may be a link.
 - *Better interpretation:* There may be a link between better interpretation and increased spending. If a visitor is provided with better interpretation of a site they can make more links between that site and their own interests. These sorts of links could be termed ‘mental hooks’. For example, detailed commentaries on the audio guide about the Royal Kitchens and the menus

¹⁷ Retail income at the shop has increased since the introduction of the handsets, but the comparatively short period of operation of the audio guides means that caution should be applied to any analysis of the retail income and suggesting causality between that and the audio guides.

George Prince of Wales would have eaten could stimulate a visitor interested in cooking to buy a book about Georgian recipes at the gift shop. This is more likely to occur if the visitor has a story associated with the event (the ‘mental hook’) rather than just a menu on a sign board. The story is more memorable and so is more likely to be remembered when they get to the gift shop compared with the information on an information panel.

- *Value for money*: It is clear from the analysis of the visitor questionnaires that since the deployment of the audio guides 98.4% of visitors perceive that they have obtained excellent/good value for money. Some limited research has been conducted at the Natural History Museum which links the introduction of free entry and the better value for money that this entails with increased expenditure at the retail outlets. While these two scenarios are different the underlying issue of overall value for money does appear to have some effect on retail expenditure. Of course it should be noted that using the increased entrance fee to cover the cost of deployment could reduce the amount visitors are willing, or are able, to spend at the gift shop. This, of course, is balanced by the fact that increased revenue is obtained from every visitor though the entry fees.¹⁸
- *Rate of return*: Site income has increased because of the increase in the entrance fee. The increased entry fee is a case of ‘revealed preference’. This provides a very approximate measure of the user’s willingness to pay. This is a monetary proxy for the contribution of the value added by the audio guides. The entry fee for the site was increased by £1.20; if visitors pay this increased fee then they must feel that £1.20 of value was added to the experience.
- *Total product offer improvements*: The deployment of audio guides at the Pavilion has fundamentally changed and improved the total product offer. The deployment of audio guides has freed up guide and staff time allowing resources to be devoted towards creating potentially imaginative tours. This allows the site to target new markets, and so diversify the visitor base. This dual human guide/audio guide approach has allowed the site to create a differentiated product, which can sustain premium pricing and so raise revenue.

3.4.8 Additional costs

A number of additional costs were incurred because of the introduction of audio guides. Most of these costs are hidden and should therefore be considered when considering a deployment. These costs included:

One off costs

- *Signage*: Signage had to be introduced to show visitors where to deposit the audio guides at the end of the tour. Often audio guides (i.e. random access guides) use a number-based system where visitors key in a number found on an exhibit to access the commentary on that particular exhibit. The signage for these numbers is often forgotten when costing the introduction of audio guides.
- *Front desk redesign*: In the case of the Royal Pavilion the front desk had to be redesigned to accommodate the extra space required for the audio guide docking stations.

Running costs

- *Extra demand on staff*: The audio guides placed an extra demand on the time of staff across the museum. The front desk staff had to be trained in the use of the devices; their job then came to include the distribution of the devices to members of the public (including setting the language) with a brief explanation of how the devices worked. While this explanation could take as little as 20

¹⁸ It should be noted that research on the audio guides at the Roman Baths, Bath, UK revealed no link between the deployment of audio guides and increases in retail income. However, the contextual background and the business processes at the site differed.

seconds for a standard user¹⁹, when this is extrapolated to all the users of the devices the additional time can be expressed in terms of weeks: A maximum of 34 eight-hour days for 50,000 visitors or slightly less than five working weeks.

- The audio guides are deposited by visitors at the end of their tours at a collection point just prior to entering the shop. Shop staff then have to bring the audio guides back to the front desk, a process which then takes more staff time.

In a more positive way the audio guides increase the demand on staff at the café. With the café being on the audio guide tour the number of customers has increased. This has caused the increase in workload, but in this particular case the café is run by the Pavilion (rather than being leased out to another company) so the increased profits feed back directly into the running of the Pavilion.

What is clear is that the deployment of audio guides requires thought to be given to issues of change management and business process engineering.

3.5 Conclusions

The deployment of audio handsets at the Royal Pavilion, Brighton has had a number of positive impacts and outcomes.

- Interpretation has been improved
- Accessibility has been improved.

These primarily relate to the strategic rationale for the deployment.

Furthermore, the use of the obligatory use business model has resulted in a rapid return on investment for the technology. The risk of investment has further been lowered by leasing the hardware.

The audio guides are useful in that they deliver on a number of site goals simultaneously: disability access, education, and, importantly, the ICT has provided a mechanism for acquiring some impact and outcome data, which is used to provide marketing and operational information to improve the business functions (operations) of the site. The impact analysis results may provide inspiration and rationale for future technology investments.

However, the audio guides fundamentally alter the way that the heritage site works. They affect the site in a holistic manner and this will require consideration to be given to change management issues. Also, consideration should be given to the ‘hidden costs’ of deploying the technology, and especially the impacts that audio guides could have on staff. If managed properly the deployment of audio guides has the potential to become an important asset for heritage sites.

Importantly, this case study has raised the issue that there is another category of impact that is rarely considered, that of ‘organisational impact’. Internal issues of human resources, as well as marketing and internal benchmarking, are crucial for understanding business processes within the site.

Of course, it is crucial when considering these analyses that it is not just the technology on its own that creates the impacts and outcomes. It is the interaction between the context, business processes and the technology that creates positive outcomes and impacts.

¹⁹ The interaction time can increase for foreign visitors and the elderly; however, it should be noted that groups, families, and couples are provided with an explanation of the audio guide at the same time, which will reduce the overall time required; hence the estimate of 34 days is seen as a maximum.

Acknowledgements

Thanks are due to the Royal Pavilion for providing considerable help in this research and also Acoustiguide Ltd for allowing the reproduction of the photograph in Figure 23.

References

McLoughlin, J., Kaminski, J. and Sodagar, B. (2006) ICT investment considerations and their influence on the socio-economic impact of heritage sites. *VAST 2006 proceedings*, Eurographics/ACM. 109–16.

Appendix 1: A comparison of handset-based audio guides and downloadable audio tours

The use of audio guides at heritage sites is increasing in popularity; however, there are some issues with the business model for deploying the devices, including:

- High initial setup costs
- Demand can exceed supply during popular periods
- Such guides are most applicable for use at manned attractions.

An alternative (or supplementary strategy) is to make the audio tours available for download off the Internet for those who use personal music players (such as MP3 players), mobile phones, and PDAs. These audio tours can then be stored on the user's own device and listened to when the attraction is visited.

Institutional perspective

From the perspective of the institution deploying the audio tours the advantages of such systems include:

- The cost of the deployment is reduced because the site does not have to fund hardware. However, costs still remain for content creation.
- Staff time and resources will not be directed towards the distribution and collection of the handsets or dealing with equipment issues (this could be beneficial for unmanned sites or those with restricted staff numbers, as well as towns and cities with a wide geographical dispersal of heritage sites).
- Open access heritage sites could be visited outside of peak hours, thereby alleviating peak period rushes.

The visitor perspective

- Visitors can use their own equipment rather than having to familiarise themselves with the operation of an alternative technology (set up costs are lower because no end-user hardware is required).
- Visitors can preview and access information about a heritage site before visiting (this can help with preparation for school visits).
- Visitors are able to benefit from heritage walks or town trails outside of the opening hours of the local tourist office.
- The information can be kept for future research or as a memento of their visit (this is seen as a mechanism for encouraging repeat visits).

Of course, there are a number of issues with such deployments, if they are not supported by the use of handsets at the site:

- The deployment of the devices is dependent on the take up of PDAs and other mobile devices with similar functionality. While there is strong growth and take up of these devices in some European countries, there is going to be a long period before these devices are 'commonplace'.
- The initial take up of these devices is likely to be by the well-educated (socio-economic groups A, B, and C1); this could reinforce the current socio-economic barriers in heritage sites and the digital divide.

Bearing these factors in mind downloadable audio tours work best as a complement to site-based handsets, although in areas where handsets are impractical, or cost is an overriding concern, downloadable content is a useful technology for sites to consider.

4 Deploying and assessing the impact of audio guides at the Roman Baths, Bath, UK

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This paper describes the reasons for the introduction of audio guides at the Roman Baths and the criteria established for the kind of system most suitable for its visitors. The audio guides have had a profound effect on the site since their introduction in 1995 and their impact on both staff and visitors is examined. The potential of the audio guides to return information about on site visitor behaviour and preferences is discussed and the paper illustrates how these data are analysed and used to improve the quality of interpretation for visitors.

4.1 Introduction

The Roman Baths is one of the most important ancient sites in Great Britain. It lies at the heart of the City of Bath, inscribed in 1988 on the UNESCO World Heritage List because of its unique urban landscape and outstanding architecture, particularly from its eighteenth century heyday. The Roman Baths is a scheduled ancient monument, a designation which includes the substantial *in situ* remains of the Roman Temple of *Sulis Minerva* and the late eighteenth century Pump Room directly above them.²⁰ At the centre of the complex rises the largest of the city's three thermal springs, the King's Spring, which disgorges over one million litres of geothermal water per day at a constant temperature of 46°C. Hydrological research suggests that this flow has continued unbroken for many thousands of years (Stanton 1991). The site also includes the Roman Baths Museum, whose collections, many of which derive from the monument itself, are 'designated' by the Government as being of national importance.



Figure 31: The north-west corner of the Great Bath, Bath, UK.

²⁰ For a general description of the Roman Baths and its associated buildings and finds, see Bird and Cunliffe (2006). For a more detailed survey of the discovery, description and evaluation of the monument, Cunliffe (1969) and Cunliffe and Davenport (1985) are essential reading.

The full extent of the Roman Baths became clear during the 1880s when numerous properties in the city centre were cleared away to reveal the rectangular lead-lined Great Bath, complete with paved ambulatories and *exedrae* on north and south sides. Further excavations in the 1890s, 1920s and 1970s exposed the extensive east and west ranges of hypocaust rooms and immersion pools, some of which had been revealed briefly and then re-buried in the eighteenth century. Since the Roman Baths first opened to visitors in 1897, successive excavations have extended the visit until the full extent of the bathhouse could be seen. In the early 1980s a major engineering scheme underpinned the eighteenth century Pump Room and enabled the excavation of part of the inner precinct of the Temple of *Sulis Minerva*. Upon completion in 1983, the Roman Baths Museum was extended into this area, adding to the quantity and complexity of *in situ* remains available for public inspection.

The *in situ* remains of the Roman Baths and Temple lie six metres below present street level and it is necessary for the visitor to descend through the undercroft of the late nineteenth century Pump Room extension to reach them. This extension, built as a concert hall, now serves as the main entrance and reception hall where the visitor welcome, ticketing and audio guide distribution take place. From here the visitor proceeds onto a *loggia* and galleries overlooking the Great Bath before descending into the museum beneath the reception hall where architectural fragments of the temple buildings and other finds from the site and the wider Roman settlement of *Aquae Sulis* are exhibited. The visit extends under the Pump Room to take in the temple precinct and view the King's Spring before returning to the museum. The visitor then leaves the museum for the Great Bath chamber and explores the full extent of the bathhouse before leaving at the western end through the Roman Baths shop.

Visitor numbers rose dramatically through the 1980s. The decade started with numbers around 500,000 per annum but a reorganisation of the city's marketing activities and the two-year excavation of the temple precinct beneath the Pump Room which attracted national media coverage led to a dramatic rise in visitation. In 1986 numbers topped one million and were heading to exceed this in 1987 until the bombing of Libya from American bases in southern England and the Chernobyl disaster combined to reduce the eventual annual total by around 25%. Numbers never regained their earlier levels. However, a lesson learned in the mid-1980s was that the Roman Baths could not comfortably accommodate such large numbers and still deliver a good quality experience, and the decision was taken to maintain annual numbers at around 900,000 per annum and concentrate on improving the quality of the visitor experience. The introduction of audio guides in 1995 was part of this strategy.

Part one

4.2 Deploying the audio guides: Criteria and specification

The following criteria and specifications were used in the deployment of audio guides at the Roman Baths.

4.2.1 Drivers for change

Until 1995 interpretation was provided in very traditional forms. These consisted of a few simple models, graphic panels and labels in English and regular personal guided tours of the Baths only in English. While this may have been sufficient during the 1980s when audiences seem to have been relatively uncritical, by the early 1990s it was clear that it was inadequate to meet their needs. There were several reasons for this:

- Visitors were becoming more discerning. As international tourism extended its reach to allow access to ever more distant lands and their ancient sites, so international travellers became more experienced and their expectations of the quality of presentation and interpretation rose accordingly.
- For the same reasons as above, the superficial and mono-lingual interpretation of the site was no longer sufficient.

- The Roman Baths is a complicated site to interpret, involving not just the Baths but the *in situ* remains of part of the Temple complex, the site museum containing architectural fragments from the temple buildings and a fine epigraphic and sculptural collection from other Roman buildings, shrines and cemeteries within and outside the walled area of *Aquae Sulis*. The natural phenomenon of the thermal springs, the relationship between the Roman stratum and the eighteenth to twentieth century buildings above it, and the intermittent and prolonged process of discovery by which the Roman remains came to light were all stories that needed to be told.

It was also becoming apparent that other major visitor attractions were introducing audio guide technology to provide more lively and innovative means of interpretation, beyond the ubiquitous cassette tours that had been around for many years. Perhaps for the first time, historic sites began to compete with each other not just on the quality of their product – the buildings, monuments and collections – but on the quality of the interpretative media they could offer.

It is worth noting here a number of issues that were *not* drivers for change. The introduction of audio guides at the Roman Baths was not an income-generating venture; on the contrary, it came at a price and a separate business case was made for including them within the admission charge. Nor was it an expedient to make savings on staff costs. Staff were needed to manage the system on site and, although the frequency of guided tours was reduced from three or four per hour to one per hour, it was felt important that the personal tours of the Baths in English should be retained. One of the dilemmas encountered while investigating the feasibility of introducing audio guides was that research at the time (Touche Ross 1989) showed that visitors to museums rated ‘qualified guides’ as more important than ‘pre-recorded guides’.

Nevertheless the final consideration was a financial one. A commitment to introduce audio guides in six languages as the principal means of interpretation and offering one to every visitor was going to be costly. In the early 1990s visitor numbers were around 900,000 per annum and the business strategy of the time was not to increase numbers but to improve the quality of the visit and the value for money to the visitor. In addition to the introduction of the audio guides, a capital project to redisplay the eastern range of Roman bathing rooms was planned. To fund both projects, a business case was prepared and presented to the Council for approval, which involved increasing the headline (adult single) admission charge in April 1994 from £4 to £5, with similar increases down through the whole tariff of charges. By making this one substantial ‘price hike’ both projects could be funded in full. The business strategy was approved.

4.2.2 Specifying the service

Having established the principle that audio guides should be given to visitors and that they could be afforded, research was necessary to identify what equipment was available on the market and which system would meet the needs of the visitors. Managers visited a number of attractions in England and Wales to examine the different systems available. When the information derived from this exercise was considered in the context of the nature and layout of the Roman Baths and the volume and composition of its visitors, a number of determining factors became clear.

Headsets were ruled out, for two reasons:

- It took too long to ‘dress’ the visitor with them; timed observations at one attraction showed that it took an average of 55 seconds per person to fit and adjust the headsets and explain the functions of the cassette player. With around 900,000 visitors per annum to process, this length of time was impractical; the equipment had to be easy to distribute and easy to explain to visitors.
- It was considered a disadvantage that headsets enclosed listeners in their own ‘sound world’, separating friends and families from each other and suppressing the stimulus and enjoyment of discussion.

A cable-free system was favoured for a number of reasons. The installation of wiring throughout a scheduled ancient monument would have been fraught with difficulties and, in some parts of the Baths, virtually impossible. Infrared systems were observed to have two major drawbacks: commentaries were

interrupted by ‘dead spots’ in some areas and, more seriously, visitors were likely to enter a zone part-way through a narration and have to wait for it to finish and start again. It was agreed at the outset that not only would this cause unnecessary delays, it was also not of a standard that visitors to the Roman Baths deserved.

The requirement to be cable-free meant that the technical solution would be carried by the visitors themselves and would not depend upon cabling and infrared radiators. Of the equipment available, random access digital audio guides were deemed to be most suitable. These fulfilled another requirement, that the visitor should be in control of the visit and should choose what to listen to, when to listen to it, and whether to listen to it.

With a sizeable proportion of non-English speakers and the propensity for foreign groups to arrive unexpectedly, it was essential that the audio guides could be reprogrammed quickly in another language at the entrance. The numbers involved meant that it would have been impossible to hold in stock sufficient audio guides pre-programmed in specific languages for such eventualities. Moreover, the ability to re-programme audio guides at the entrance offered the opportunity to include the option of a short tour in English, which replaced the full tour at the busiest times of year to reduce the incidence of congestion.

There was considerable debate about whether the exhibit numbers through the visit should be in numerical order or random order. It was eventually decided that it should be the latter, for the following reasons:

- Although the visit is broadly linear, it is not exclusively so, which meant that it could not be guaranteed that visitors would encounter the audio tour in numerical order; this is particularly true in the Baths, and visitors could become confused as a result.
- It was agreed at the outset that the audio tour would not resemble the chapters of a book whose content depended upon their being read in the right order. The commentary behind each number (the ‘segment’) should stand alone and not be dependent upon those immediately before and after it; again, this would put the visitor in control by allowing them to choose what to listen to and whether to listen to it.
- Once visitors realised that the numbers were in random order they would avoid the inclination to ‘treasure hunt’ or ‘bag’ numbers. When the site is very busy it is easy to miss a number and random numbering obviated the risk of visitors retracing their steps in search of numbers they had missed (most likely not because they wanted to listen to them but simply because they had missed them).
- The random numerical order allowed curators to remove objects for conservation or loan without breaking the numerical sequence. Indeed sometimes it would be necessary to close whole sections of the site for essential work and this could be done without any disruption to the effectiveness of the audio guides. Indeed at peak times when congestion is severe it has proved expedient simply to remove one or two numbers to ease the public flow.

4.2.3 Principal roles of the audio guides

As the business case allowed for the distribution of an audio guide to every visitor inclusive in the admission charge, it made sense that it should be the principal vehicle for interpretation. It would do the yeoman work in six languages, guiding visitors through the entire visit and enabling them to carry their own interpretative device with them into sensitive historic environments where graphic panels could be problematic to position. In some areas where there were many stories to tell, at the end of the segment the visitor could be advised of another number to key in to gain access to a further layer of information. This proved particularly useful in respect of the important collection of inscriptions, where visitors now had the option of hearing them read in Latin as well as in English. Complex iconography could also be explored in depth in such layers, away from the main thrust of the top layer of interpretation.

It was envisaged that there would be considerable marketing benefit to the introduction of the audio guides. Not only did the Roman Baths appear to be more accessible to people whose first language was not English, the inclusion of an audio guide in the admission price also represented added value. Moreover, at a time when there was little provided specifically for children at the Roman Baths, the introduction of a ‘gismo’ captured the attention of innumerable technophile children, certainly for its novelty value if not its content. This was to come later.

4.2.4 History of the contract

A comprehensive tendering and evaluation process during 1994 led to the appointment of Acoustiguide UK Ltd as supplier of audio guides to the Roman Baths and the installation of 1,050 of the Acoustiguide Inform® handsets in six languages – English, French German, Italian, Japanese, and Spanish. The system met all of the criteria set out in the paragraphs above and went ‘live’ in September 1995. The contract was retendered in 2000 and a new contract awarded in 2001, again to Acoustiguide and this time for the AG2000® system. At the same time and in response to visitor demand, Dutch was added to the languages available. Since then, the versatility of the system and its capacity to deliver a variety of services have been demonstrated by the addition of a children’s tour in English, a tour for French students, and a special ‘Bill Bryson tour’ in English.

Part two

4.3 Assessing the impact of the audio guides

The deployment of audio guides at the Roman Baths was assessed using numerous methods. The following impacts were found:

4.3.1 The impact of the introduction of audio guides on staff

It was inevitable that such a fundamental change in the interpretation of the site would have implications for the staff. The staff were required to manage the audio guides system on site but, for reasons described above, it was felt important that the option of a personal tour of the Baths in English should be retained. The layout of the site also meant that visitors could not return the equipment to the point of distribution at the entrance but would deposit it at a collection point at the exit. Staff were therefore needed to return the audio guides to the entrance where they would be docked for data downloading and recharging before re-use.

These requirements were a contributing factor in the move away from task-specific staff such as ‘receptionists’ and ‘guides’ towards the more generic and multi-tasked role of ‘visitor services assistants’, which integrated those duties, now including the distribution of audio guides, into a multi-functional round of activities. For many staff this increased the variety of their work and job satisfaction, their understanding of the whole visit from start to finish and not just a small section of it, and it improved their range of skills and ‘product knowledge’. More recently it has proved more efficient to introduce a separate staff category of ‘porters’ whose sole task is to carry the audio guides back from the exit to the entrance.



Figure 32: Audio guides being used at the Roman Baths, Bath, UK.

4.3.2 The impact of audio guides on the quality of visit

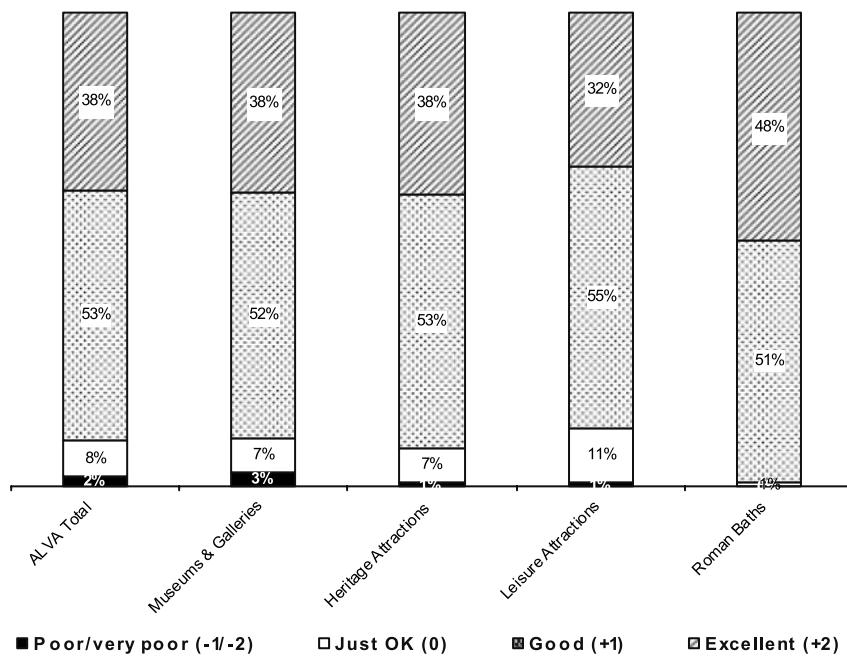
From the beginning the audio guides had a profound effect on the ‘quality of visit’. Vast quantities of hitherto inaccessible information about the Roman Baths, the Temple and the museum collections were released into the public domain and were devoured by visitors, for most of whom the technology was still something of a novelty. The first noticeable effects were twofold:

- The site, and particularly the more enclosed areas, became quiet. Critics described this as an uncomfortable silence, while the more sympathetic saw it as a step forward: the Deputy Director of the South West Museums Council, David Hill, said that the audio guides had “returned a sense of awe” to the museum.
- The length of visit increased by up to 25%. This improved the sense of value for money for visitors, but it also caused unforeseen problems for tour operators whose guides needed to round up their charges and whisk them on to other destinations. It is possible that this had an adverse effect on spend in the Roman Baths Shop at the exit although no data exist to validate this.

Visitor feedback mechanisms such as comments forms, visitors book, exit surveys and mystery visits yield valuable information about the response of visitors to the audio guides. Hardly any visitors object to them in principle; many respond favourably and, where there are criticisms, they tend to focus on specific issues such as the length of the segments or the nature of a narrator’s voice. Issues such as these can be addressed, if not immediately, by editing, re-writing, and re-recording.

Through its membership of the Association of Leading Visitor Attractions (ALVA), the Roman Baths conducts detailed exit surveys twice a year to learn more about visitors’ response to the nature and quality of the visit. Each participating site receives its own survey results on a confidential basis, while for comparative purposes all participants see the total response aggregated across all attractions and then sorted into the different membership categories. The Roman Baths belongs in the ‘Heritage Attractions’ category. The graph shown in Figure 33 below shows how visitors responded to the exit survey question about ‘the provision of information to explain features / exhibits’ in the early months of 2007. This graph

suggests that the prominence of the audio guides in the interpretation mix has a positive effect on visitors' appreciation and understanding of the Roman Baths.



*Figure 33: Providing information to explain features and exhibits:
A comparison of Roman Baths visitor survey responses with those at ALVA attractions.²¹*

4.3.3 Data retrieval facility

It is ironic that the potential of the audio guides to provide valuable information about how visitors behave was only fully realised at a later date. At the time of commissioning the service it was regarded as an incidental benefit to the installation of the system; the ability of the Inform® system to capture data and analyse it was initially seen as a 'nice-to-have' rather than a 'must-have' feature. However, while it would be going too far to suggest that an inclusive audio guide system would be installed purely to garner information about patterns of visitor behaviour, there can be no doubt that it became a major consideration at the Roman Baths when retendering the service.

The ability of the audio guides to deliver statistically meaningful market intelligence to the Roman Baths management depends upon two essential activities:

- The use of an audio guide by the overwhelming majority of visitors. Although an audio guide is offered to every visitor, the monthly data show that total usage is generally around 80% of total visitor numbers. The variance may be explained by the following factors:
 - The international nature of the audience means that although the service is available in eight languages, this does not meet the needs of every nationality and some do not take an audio guide
 - School groups doing project work may not use the audio guides
 - Special groups paying a premium for a personalised tour by a member of staff do not use the audio guides

²¹ The Roman Baths result is also subsumed within the Heritage Attractions group (Source: ALVA Quality Benchmarking Survey: overview of findings, Spring 2007).

- Very occasionally an individual will decline the offer of an audio guide, either for academic or technophobic reasons.
- The return of each audio guide, however briefly, to a docking point after each usage so that the pattern of use and preferences of the last user can be captured. Where this does not happen or an audio guide is not properly docked at the end of the day, the data from two or more visits are combined and become meaningless. The visitor services staff operating the system are diligent in ensuring that this does not happen so that the integrity of the data gathered can be assured.

The data are downloaded on site on a monthly basis, sorted according to a number of agreed criteria and presented in the form of tables or graphs. Every six weeks at the contract monitoring meeting, staff from Heritage Services and Acoustiguide analyse these tables and graphs for patterns, trends and anomalies, so that they can better understand the behaviour and preferences of visitors and take action where necessary to improve the quality of the visit for future visitors.

Being a PC-based system, the data can be sorted in a seemingly endless number of ways. It is important to identify those which are the most meaningful, concentrate on them, and resist the temptation to engage in fruitless and time-consuming analysis. Nevertheless one of the benefits of such a comprehensive return of data is that it is available to interrogate whenever a particular issue arises that requires attention. The principal areas compiled for attention are as follows:

4.3.4 The number of audio guide tours taken

This is the simplest and most obvious statistic to be reported by the system. As noted above, the total number of usages each month is generally around 80% of the total recorded visitor numbers, and the reasons for this are also given above. However, such a large proportion of users means that the data gathered can be relied upon to be statistically robust and they constitute a sound base upon which other questions can be asked of the system.

As raw data these numbers of usages can be sorted to analyse patterns of use across the month, the week or even the day. Figure 34 above shows the number of tours taken by visitors on every day during April 2007. The Easter weekend is particularly prominent around the 7th of the month and the final two weekends of the month also stand out.

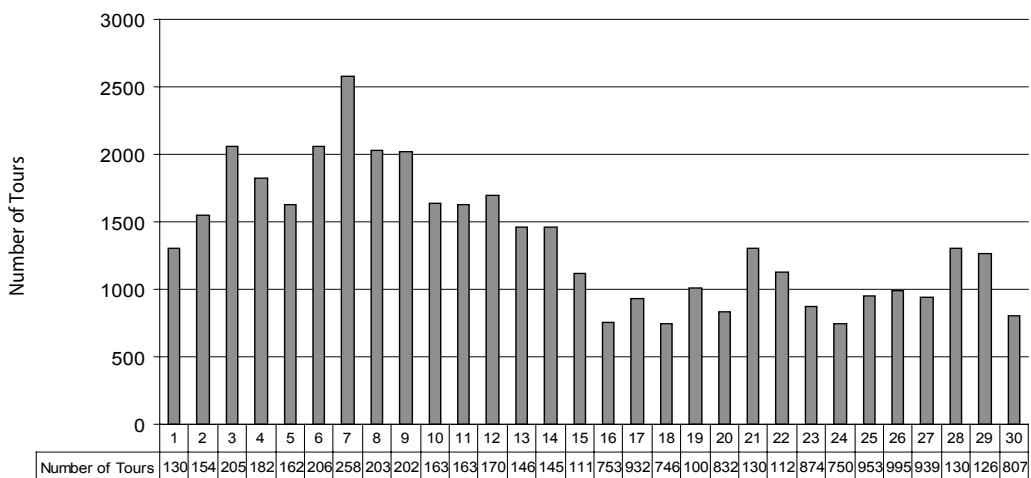


Figure 34: The total number of tours of the Roman Baths taken on each day in April 2007.

4.3.5 Trends in visitors' patterns of audio guide use

Although the Easter weekend is traditionally one of the busiest of the year, Figure 35 below shows that the average listening time over the weekends was slightly higher than during weekdays, apart from Easter Saturday (one of the busiest days of the year) when the average listening time seems to have been no greater than that of a weekday. This may indicate that on the very busiest days, the site may be so congested that visitors find it difficult to take time to listen to the tour.

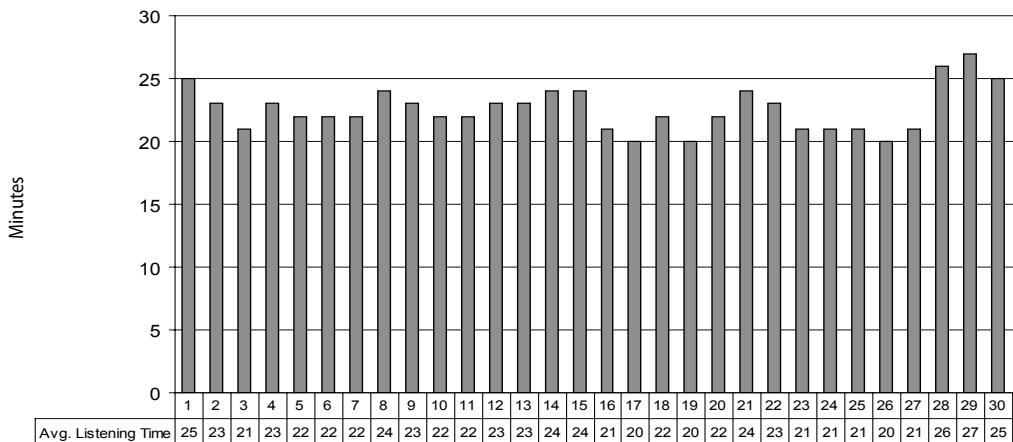


Figure 35: Average listening time per visitor for each day in April 2007.

The data can be further segmented to reveal patterns of visitor behaviour profiled across a week and even a day if required. Figure 36 below shows the average number of tours taken per day across the week during April 2007; however, more revealing is the graph in Figure 37, which indicates the daily average listening time on those days during the same month. These graphs show that in April 2007 there were more visitors to the Roman Baths on Saturdays and that they also listened to more of the audio tour than on other days.

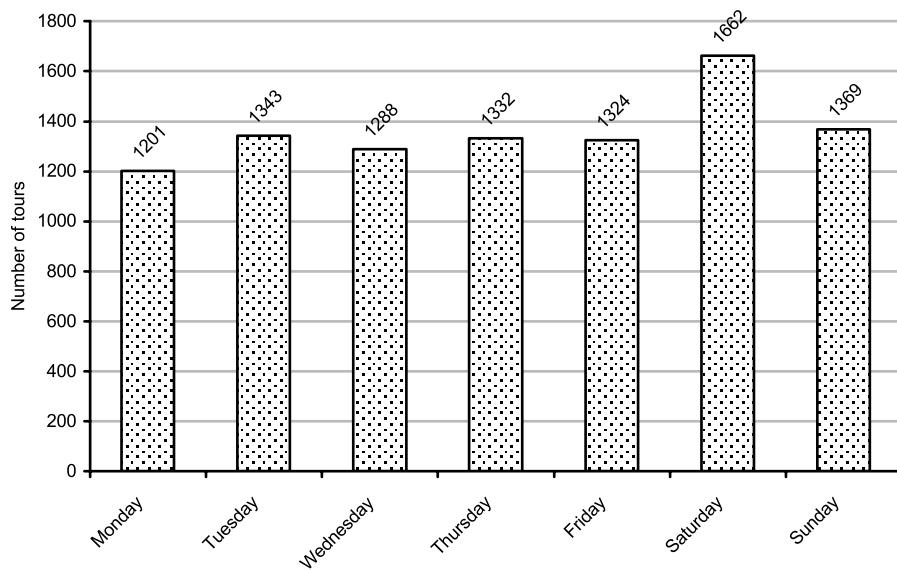


Figure 36: The average number of tours taken daily during April 2007.

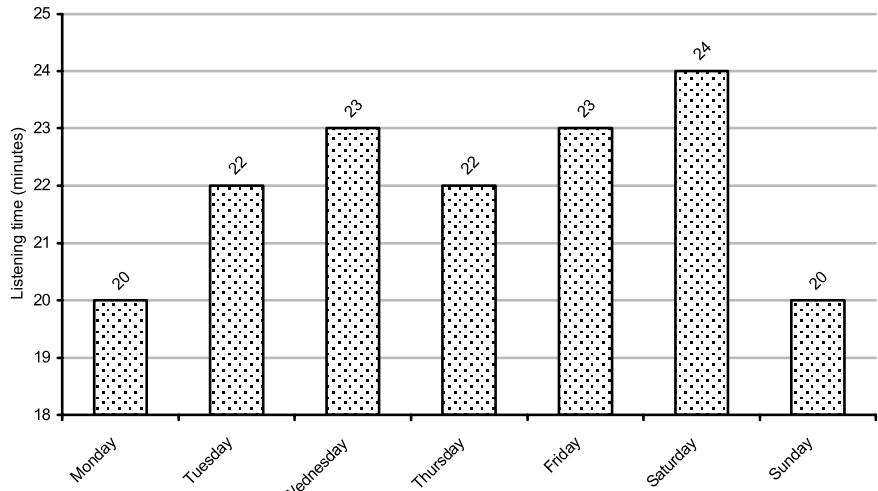


Figure 37: The average daily listening time during April 2007.²²

The graph shown in Figure 37 emphasises that during the course of a week the average listening time can vary by as much as four minutes from one day to another. In addition to enabling usage to be profiled over the course of a month and a week, the data downloaded from the system make it possible to examine the profile of activity within each day.

Figure 38 below shows the number of tours taken per hour on Mondays during April 2007. This profile of visitation across the day is helpful, both in planning rotas so as to have the right number of staff on duty at different times of day, and in anticipating when peaks of congestion are likely to occur. The removal of audio guide numbers in a few critical locations can be a simple and pragmatic expedient in minimising the risk of congestion and the visitor discomfort and dissatisfaction that goes with it.

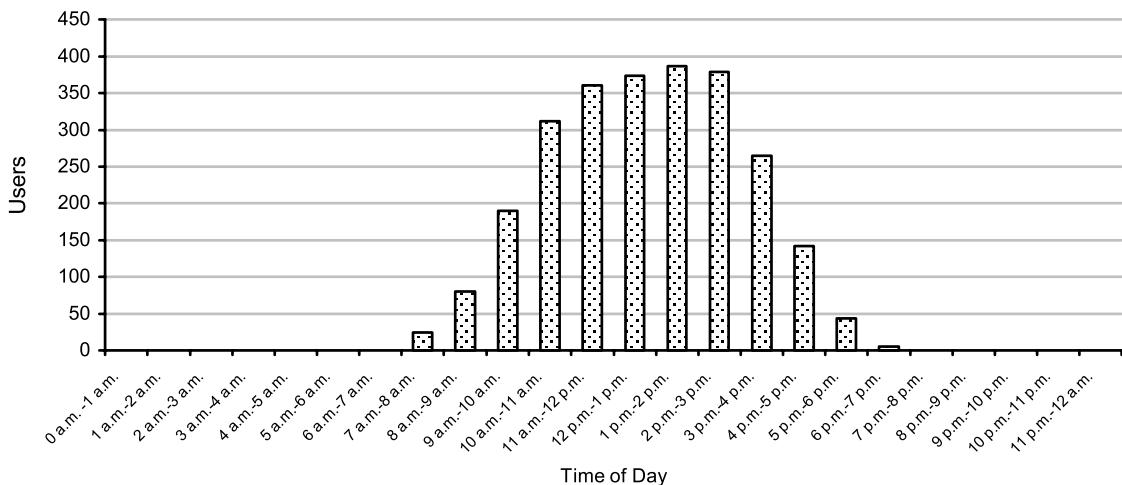


Figure 38: The average number of tours taken per hour on Mondays in April 2007.²³

It is easy to assume that, because the audio guides are the main purveyor of information, every visitor carrying one listens to it all the time. In fact the downloaded data show that this is far from the case. Figure 39 below shows that, while a few visitors listen to as many as seventy segments, the majority content themselves with far fewer; the graph extends barely half way across the horizontal scale representing the

²² The slightly lower average listening time on Sundays and Mondays is exaggerated by the nature of the graph: the vertical ‘time’ axis shows the scale only between 18 and 25 minutes.

²³ The traces before and after the normal opening hours of 9am to 6pm represent audio guides not properly seated in their charging racks.

number of segments available. This supports the evidence of Figure 37 above, which shows that during a visit which typically lasts around 90 minutes, visitors listened to no more than 24 minutes of recorded commentary.

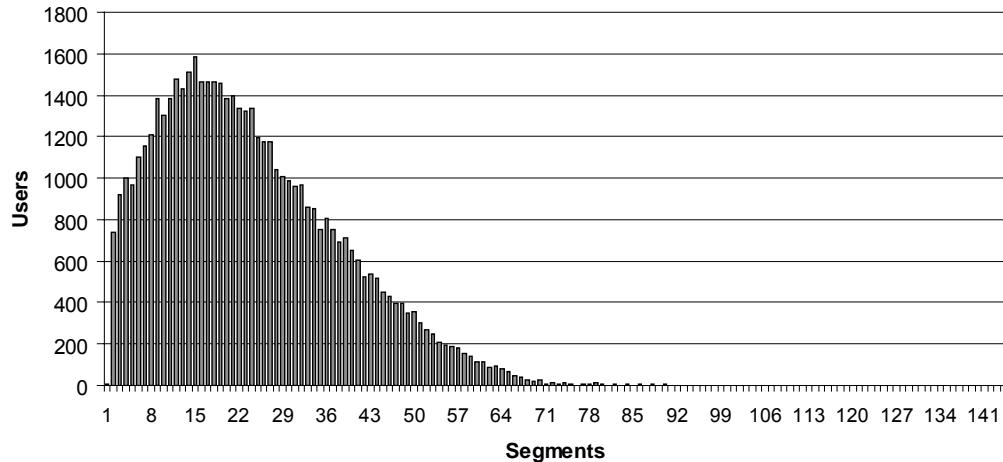


Figure 39: The number of tour segments taken by visitors during April 2007.

4.3.6 Patterns of behaviour by individual visitors

Provided that an audio guide is docked in a charging rack after each visitor has used it, the system will download every action performed with the audio guide by that visitor. From these data it is possible to analyse patterns of behaviour amongst visitors in terms of their response to individual segments. This is reported in tables of figures which show all 140-odd numbers which they could listen to during the course of their visit. It should be remembered that these include the standard tour in eight languages, a group of numbers that constitute the English children's tour and French students' tour, and a third set of numbers giving access to the Bill Bryson tour in English. As noted above, the majority of visitors listen to fewer than half of these.

Segment number	Total length (min)	Average playing time	% played
166	0:48	0:47	99 %
201	0:11	0:10	95 %
178	0:42	0:39	92 %
154	0:39	0:36	91 %
86	1:21	1:12	89 %
89	1:12	1:03	87 %
77	1:12	1:02	86 %
18	1:27	1:13	84 %
38	1:40	1:23	83 %
76	1:18	1:04	82 %
101	0:15	0:12	80 %
54	2:31	1:57	77 %
133	1:45	1:19	74 %
25	0:40	0:20	50 %

Table 4: Segments in English ranked by the average playing time, starting with those segments most listened to.²⁴

²⁴ For simplicity this table shows every tenth line only from the full report (June 2007).

Number of hits	Segment number	Number of repeats	% repeats
60225	1	13386	22.23 %
22968	18	1500	6.53 %
17969	95	594	3.31 %
14386	133	614	4.27 %
11127	72	612	5.50 %
8824	150	735	8.33 %
7267	12	812	11.17 %
5920	58	255	4.31 %
4922	88	374	7.60 %
4436	400	591	13.32 %
3696	107	327	8.20 %
3105	105	151	4.86 %
2226	189	239	10.74 %
1424	122	103	7.23 %
76	161	11	14.47 %

Table 5: Segments in English ranked by number of ‘hits’ and repeat ‘hits’.²⁵

The tables record the following sets of data about each segment and the way in which visitors responded to them over the reporting period, usually the previous month. This is repeated for all eight languages. The tables show the segments ranked by average playing time (Table 4) and ranked by number of hits and repeats (Table 5).

These data are reported by each language individually to discern any national trends and by all languages and special tours together to show the overall pattern of usage. Decisions can then be made and action taken to improve the quality of experience for visitors. For example, where the ‘% played’ is relatively low, visitors are cancelling that particular segment or moving on to other exhibits. This could be because they do not find the content interesting or because the segment is too long. Either way, the action considered will be either to edit down the narrative to make it shorter or to relegate some information to a second ‘layer’ and give the listener the layer’s number at the end of the primary segment. The layers are also reported in these tables so that their popularity can be examined in the monthly reports.

A high number of repeats may indicate either that visitors do not understand an explanation on first listening, or possibly that they have enjoyed a narrative and wish to hear it again. In the case of number 1, the welcome and explanation of how the audio guide works, around a quarter of all visitors play it again for reassurance that they have understood what to do. In a few areas of the site the same number appears on two different signs and this can explain the relatively high number of ‘hits’ on those segments.

4.3.7 The visitors’ choice of language

Upon arrival visitors are invited to select a language of their choice from the eight available. This means that the patterns, trends and anomalies referred to above are recorded in each of these languages. The languages selected in April 2007 are shown in Figure 40 below.

²⁵ For simplicity this table shows every tenth line only from the full report (June 2007). The high number of ‘hits’ on segment number 1 is because it is the introductory explanation which all visitors are invited to listen to. This may also explain the high number of repeat ‘hits’.

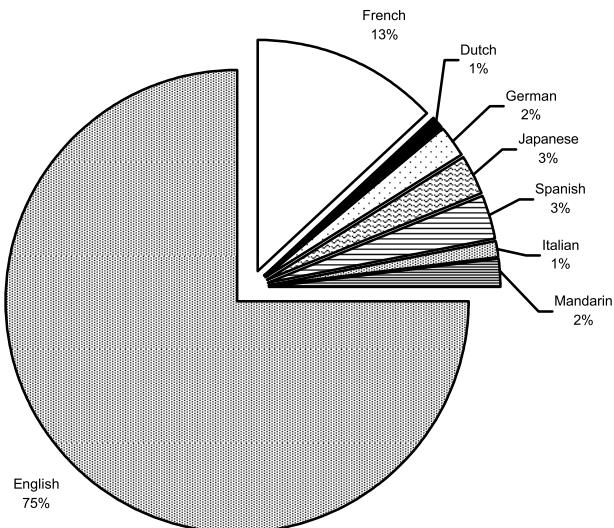


Figure 40: Languages used in April 2007.

This information is treated with caution. It is not an accurate measure of the nationality of the visitors, merely of their language of choice from those available. For example, within the English users there will be a number of Americans and a smaller number of visitors from other parts of the English-speaking world. The distribution of leaflets in languages not on the audio guides indicates that there are nationalities for which none of the audio guides is preferable. Current trends indicate a growing number of Russian speakers amongst the visitors.

As an aside, it is worth mentioning here the issue of using flags to identify audio guide languages. This is a widely accepted convention and it would be thought unlikely to be controversial. For example, American visitors appear to have no difficulty in accepting the use of Union Jack to represent the English language. Nevertheless geo-political sensitivities can be aroused, as evidenced by the Taiwanese visitor who objected to the use of the flag of the People's Republic of China to represent the Mandarin language. This objection was noted and discussed but, as an isolated incident, was not considered sufficiently serious to abandon the use of flags to denote languages.

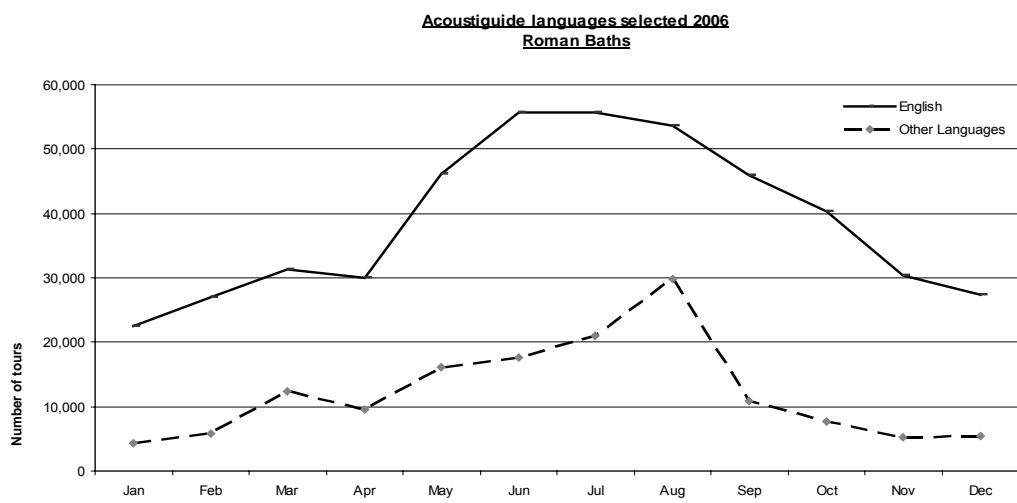


Figure 41: Graph showing the cumulative use of audio guides in English and the other languages during the calendar year 2006.

The data demonstrating use by language are also monitored for seasonal trends. French is particularly prominent in the months from March to June when many language schools bring student groups to the Roman Baths. Figure 41 and Figure 42 show how the pattern of use by language is reported.

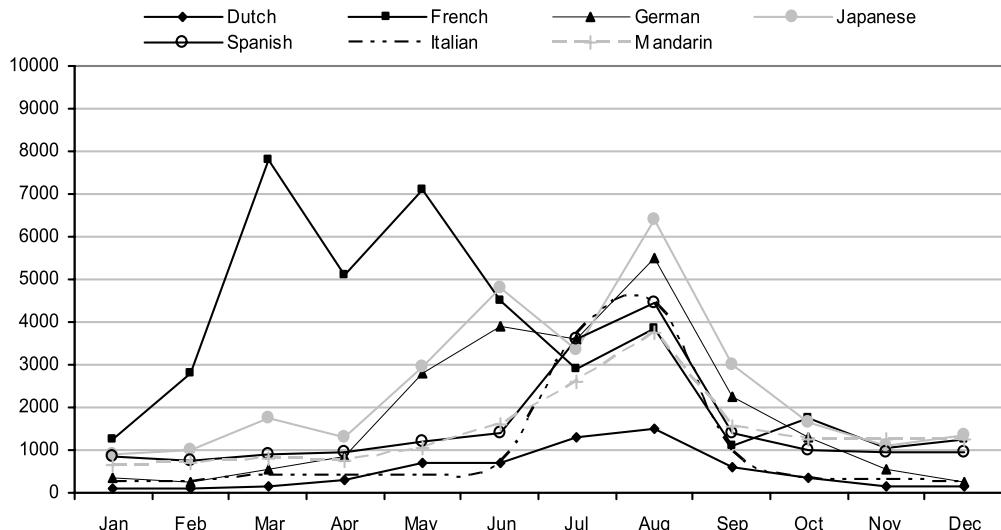


Figure 42: Graph showing the cumulative use of audio guides in all languages but English during the calendar year 2006.

It is also possible to analyse longer-term trends in the selection of languages by visitors. Figure 43 below demonstrates the annual fluctuations of the non-English languages. A decline in the use of audio guides in Japanese can be seen since 2004, possibly caused by unfavourable economic circumstances manifested in exchange rates and the cost of long haul flights. As few other nationalities are likely to select Japanese as their language of choice, this may be regarded as a reliable indicator of the trend in in-bound tourism from Japan, although confirmation was still sought that it was an indication that Japanese visitors were not coming to Britain and not simply dropping Bath from their itinerary. The increase in the use of audio guides in Mandarin from 2005, when they were introduced, to 2006 is particularly noticeable.

A recurrent question is whether – and when – to add new languages to the system. The costs of translation and recording by professional voices are considerable. Figure 43 above shows that the decision to add Mandarin was immediately justified but there is a question mark over the retention of Dutch under the new contract in September 2008. This was added in 2000 following feedback from Dutch visitors who protested that they should not be denied interpretation in their native language simply because they speak good English, German and French. The distribution of information leaflets in Dutch at that time indicated that take-up would be around 5,000 per annum and this has proved to be accurate. However, despite the inclusion of the availability of Dutch audio guides in marketing literature and on the website, there has been no significant increase in the number of Dutch visitors to the Roman Baths.

The rising number of visitors travelling to the UK from Eastern Europe has been reflected by the increase in the number of language leaflets distributed, particularly in those given to Russian-speaking visitors. At the time of writing these do not yet number as many as the Dutch-speaking visitors attested by the audio guides, but they are increasing steadily. Within the next year it will be necessary to decide whether to replace Dutch with Russian or, memory capacity permitting, to add Russian as a ninth language.

Roman Baths
Acoustiguide languages (not incl.English) 2003 to 2006 - by language

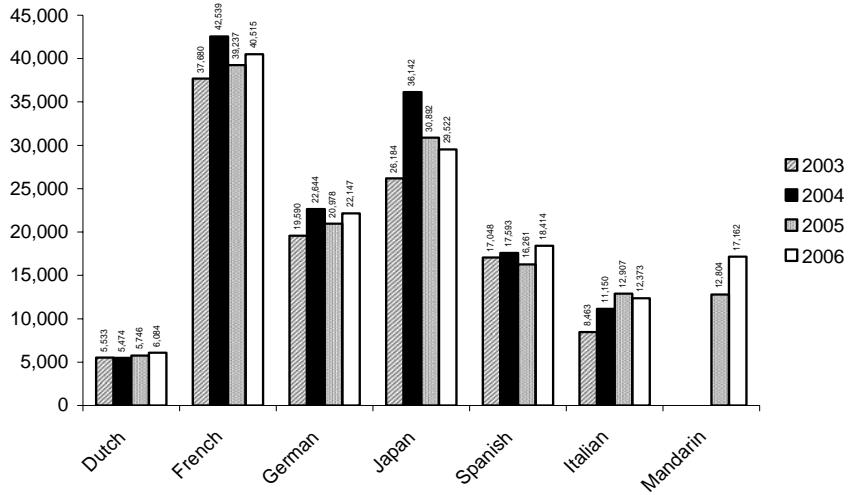


Figure 43: Table showing the fluctuations in the use of audio guides in other languages at the Roman Baths from 2003 to 2006.

4.4 The way forward

As noted earlier, because the audio guide system is PC-based, it is possible to extract vast quantities of information and analyse it in many different ways. On occasion the Roman Baths management asks Acoustiguide to provide information in a particular way to answer a specific point. For example, in 2006 the monthly number of ‘hits’ and ‘repeats’ was re-sorted to be presented in the order of the visit to ascertain whether visitors were listening to the same amount of information towards the end of their visit as they did at the beginning. The conclusion reached was that this was not a significant concern and that particular table was subsequently dropped from the monthly report.

Feedback from visitors through comments forms, exit surveys, and the visitors book has shown that the audio guides have remained popular throughout the twelve years since they were introduced. Nevertheless the evidence of recent years is that the average listening time by visitors has been declining. This is demonstrated in Figure 44 below.

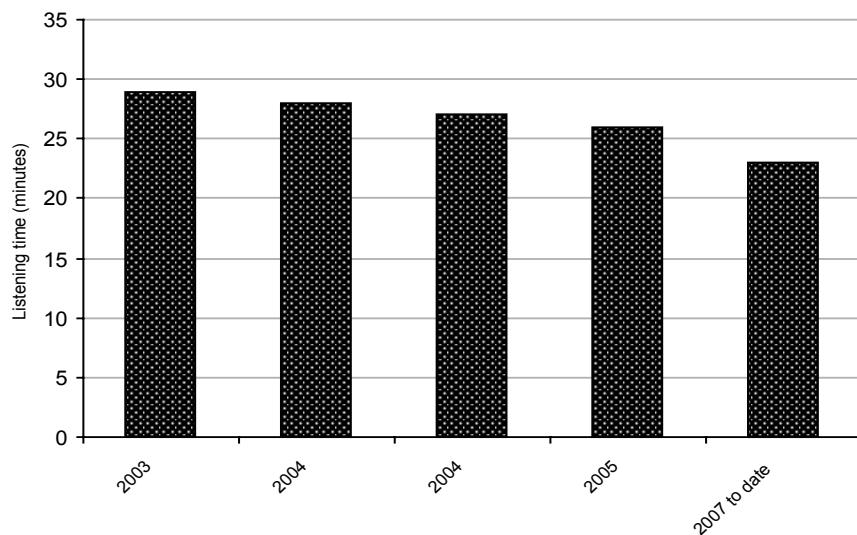
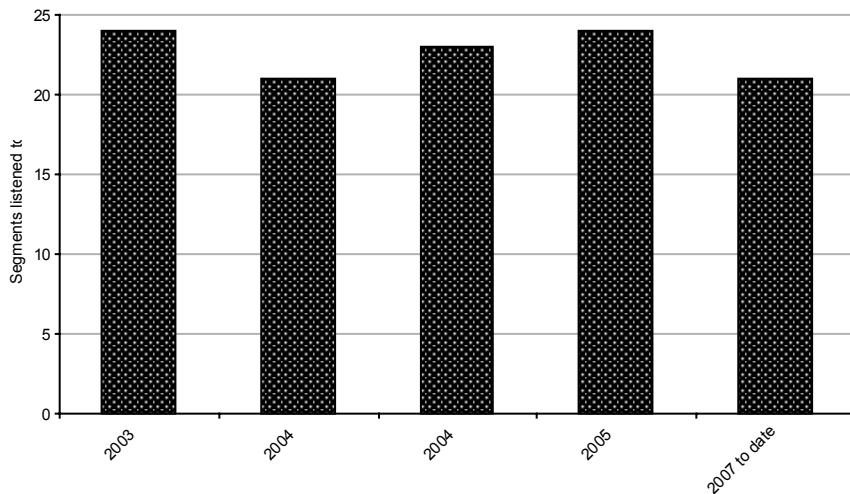


Figure 44: Average listening times per year from 2003 to 2007 (to July).

Is this decline in listening time because audio guides are no longer a novelty, because visitor expectations have risen, or because attention spans have declined? At present the data from the audio guides alone will not answer these questions but it is a trend that cannot be ignored.



*Figure 45: Average number of segments listened to by visitors by year from 2003 to 2007 (to July).*²⁶

Nor is it the want of choice. 2006 saw the introduction of the children's audio guides and the Bill Bryson tour, both in English, which added considerably to the choice available to English-speaking visitors – around 75% of visitors. Figure 45 below shows that the trend in the average number of segments chosen by visitors over the same period is less clear.

What of the future? While audio guides remain popular and are being deployed by more and more attractions, increasingly on an inclusive basis, this may have the result of reducing their pulling power in the Roman Baths marketing. This, combined with the trend away from didactic interpretation and towards more interactive experiences, suggests that the future may lie in a mixed basket of interpretative media for visitors to engage with, in which the audio guides are used in conjunction with other techniques and in ways that engage and involve the visitor. While the audio guides will remain the principal vehicle for interpretation for the foreseeable future, current plans to improve interpretation throughout the visit through a major development plan over the next five years will include closer integration of the audio guides with other physical, electronic, and digital media.

Acknowledgements

Thanks are due to Acoustiguide Ltd for their permission to reproduce graphs and tables presented in this paper.

References

- Bird, S. E. and Cunliffe, B. W. (2006) *The essential Roman Baths*, Scala Publications: London.
- Cunliffe, B. W. (1969) *Roman Bath*, Society of Antiquaries: London.
- Cunliffe, B. W. and Davenport, P. A. (1985) *The Temple of Sulis Minerva at Bath*, Oxford University Committee for Archaeology Monograph No.7: Oxford.

²⁶ This is out of a total number of segments in English of sixty-three in the main tour, forty-two in the children's tour, and thirty-one in the Bill Bryson tour.

Stanton, W. I. (1991) Hydrogeology of the hot springs of Bath, in Kellaway, G. A. (ed.) *Hot springs of Bath: Investigations of the thermal waters of the Avon Valley*, Bath City Council: Bath.

Touche Ross (1989) *Museum funding and services: The visitor's perspective*. Touche Ross: London.

5 Opening Kew Palace: Presentation and evaluation

*David Souden
Historic Royal Palaces*

This chapter presents Kew Palace, the smallest property that Historic Royal Palaces shows to the public, and the story of its recent re-presentation. It was a fairly bold endeavour within the heritage world, and attracted a great deal of comment both public and informal. Evaluation of the project has been essential, both to gauge the success – or not – of this venture and to provide data for the future. Some new techniques are shown and discussed, and the overwhelming visitor response has been positive.

5.1 Introduction

At the end of April 2006, Kew Palace reopened to the public after a ten-year closure. The title ‘palace’ is grander than perhaps the building itself merits: it is a brick villa, originally built in the 1630s, and it subsequently became a royal overspill home. The palace stands within the Royal Botanic Gardens Kew, close to the River Thames and well upstream from central London. Its place in history is guaranteed by the fact that it housed George III and his immediate family during a period of family and national crisis at the very opening of the nineteenth century.

Kew Palace is the smallest property in the care of Historic Royal Palaces, the charity charged with the conservation and presentation of the ‘unoccupied homes of the sovereign’ – the Tower of London, Hampton Court Palace, Kensington Palace, the Banqueting House Whitehall, and Kew Palace. These are among the most visited historic sites in the country, attracting some three million visitors a year. They have all been open to the public for a century or more, and are in themselves an object lesson in the changing ways of presenting historic properties.

After the fire that engulfed one wing of Hampton Court in 1986, the project to re-present the royal apartments of King William III as they would have appeared when first occupied in 1701 set a new standard in historic house presentation. It also set a particular path of painstakingly accurate re-creations of interiors, frequently unmediated by ‘intrusive’ schemes of interpretation. Twenty years on, Historic Royal Palaces and indeed the world were ready for a different approach, one that would use new technology as its servant in unlocking the stories and the emotions within a historic property. Kew was our test-bed.

5.2 A brief history and tour of the palace

In 1631, a City of London merchant called Samuel Fortrey built himself a shining new brick mansion on the south bank of the River Thames at Kew, upstream from London. This would become a royal home with a unique and compelling story.

An earlier property had stood on the site – probably an Elizabethan courtier’s house. The new house, later to be known as the Dutch House, was eventually let out. By the early eighteenth century those tenants were the royal family. Kew had a concentration of royal homes, notably the White House that stood opposite with sweeping landscape gardens behind. The Dutch House was a convenient additional home for courtiers or princesses; by the 1750s it was a schoolhouse for young princes. By then the house had been bought by the royal family. For periods after 1801 it became a palace itself.

King George III (1760–1820), Queen Charlotte, and some of their daughters lived here during the family and constitutional crisis caused by the King’s apparent insanity, now recognised as the metabolic disorder porphyria. This period came to an end when the King recovered sufficiently; but it was at Kew Palace that Queen Charlotte died in 1818. Just before her death she witnessed the marriage here of two of her sons to secure an heir and the future of their dynasty.

At this point royal occupation ended. The palace stood empty until 1898 when Queen Victoria – the product of one of the marriages that had taken place there eighty years before – gave Kew Palace to the nation. After a century the palace was closed for essential structural repairs. In 2006 Kew Palace reopened to public view once more.

The story of royal occupation from 1801 is at the heart of a tour of the palace. Some of the rooms have been returned to how they were around that time. In parts that have not been open to public view before, on the second floor, time has almost stood still. Many of these spaces have been untouched since they were last occupied, empty of furniture but with their historic paint surfaces intact. The story of George III, his family, and the shadow cast by his illness interlocks with the story of the house. This is a unique place.

The separate Welcome Centre is the introduction to Kew Palace, its setting in Kew Gardens, and its royal occupants. The path leads to the front door of the palace. You step inside to enter the world of George III, his family and their home; the stories are told through a sound drama, the pictures, furniture, and objects they would have seen, and the effects of the passage of time. This mixture of sound and a variety of presentation techniques is what helps make Kew special.

In the Ante Room leading left off the entrance hallway you come face to face with King George – his wax head, modelled by Madame Tussaud herself. Royal passions are explored in the King's Library: his drawings, scientific objects and exploration, and above all his beloved Queen, Charlotte. Tantalising glimpses of newly discovered sophisticated decorative schemes from the seventeenth century peek out from the painted panelling. In the Pages' Waiting Room, where servants waited to do the royal bidding, Queen Charlotte's story unfolds through sound and projected images. Her marriage to the young King George was a happy one and the couple had 15 children. Yet a hint of sadness creeps in, as behind the door to the former west wing, since demolished, were the quarters made for the King and in which at times he was restrained. The King's Dining Room retains many features of the original dining hall of the house. Here in his more lucid moments the King ate – frugally – often attended by politicians and friends. Here, too, he listened to music. The King's Breakfast Room was where he took his morning refreshment, but in earlier years it served as a schoolroom for George III himself when a boy and later for his son, the future George IV. Sounds of childhood fill the air. The doll's house that the King's daughters decorated themselves stands at the centre.

Up the stairs, the mood darkens as the story of the King's malady, his supposed insanity, takes over.

In the Queen's Boudoir, now redecorated in the strong colours and patterns favoured around 1800, the anguish suffered by the Queen is relived. The Queen's Drawing Room, with George III's harpsichord, was the setting for the double marriage of the Dukes of Clarence and Kent in 1818. In the corridor beyond, the King is heard confronting his doctors who treated him with methods that seem barbaric today. In Princess Elizabeth's Dressing Room, the satirical prints that lampooned the royal family and revolutionary France are a reminder of life beyond the palace walls. Princess Elizabeth was given the freedom to decorate her Bedroom in the latest style, re-created here. Little by little the history of the house and its conservation emerges alongside the family drama. In Queen Charlotte's Bedroom the time frame returns to 1818. Here she died, with her son the Prince of Wales at her side. The King's sad end, senile and alone at Windsor, is told in the Queen's Ante Room beyond.

On the second floor, you enter a world previously unseen by the public.

Here the house itself takes over the story. The corridor offers pictorial glimpses to the servants' world in the attics (closed to visitors) and views of the gardens and the river. Many of the rooms on this floor have lain untouched for almost two centuries. They are a precious survival. Paintwork, fragments of wallpaper and even exposed structure of the building cling on. The largest apartment was Princess Augusta's with Outer and Inner Closets and her Bedroom. Thoughts and words of long dead princesses occupy these spaces, nowhere more so than in Princess Amelia's Bedroom next door. Her early death in 1810 sent the

King into a final decline. Here so many elements of the house and its history are open to view. There are final thoughts of the palace's abandonment in her Dressing Room beyond.

Going downstairs again, the different elements of the story – house and family – should all make sense. All the emotions the visitor will have experienced – for this is an emotional place – come together. The visitor can revisit the Welcome Centre, or may simply wish to return to Kew Gardens, the exotic horticultural world originally shaped by the very same royal family.

5.3 Information technology and Kew Palace

This description may appear to be a traditional form of historic house presentation. Three elements make it different.

- First, the whole house has been cabled (with Cat 5), so that at almost any point the opportunity for data transmission is available. This is a Grade I building and also a Scheduled Ancient Monument, so immense care was required in threading a spaghetti web of cables through and between the floors.
- Second, the emphasis has been on constructing an emotional journey through the house, using all and every means of producing the desired effect. Sometimes this is traditional, sometimes novel. Sound in particular, light, vision, shadow, typography, even showcases all play their part.
- Finally, the main focus is on the emotional story of the principal characters, George III, his wife and daughters, a dysfunctional royal family in the grip of personal tragedy. As their story fades away so the story of the house gradually takes over. Universal IT capability and presentation techniques contribute to the telling of the emotional story in myriad ways.

The main carrier of interpretation is audio, a sound drama that plays out through the ground and first floors of the house. Silence takes over once Queen Charlotte's death has occurred. The encapsulating thought was that this would be 'a radio play inside a doll's house' – Kew Palace looks like a doll's house itself, and it contains the 'baby house' that George III's daughters made themselves. Sometimes that is supplemented by projection, of still or moving images, always directly onto wall surfaces rather than screens. Some of these projections have sound, others are silent. The visitor's first encounter inside the house is with George III himself, the wax head sculpted by Madame Tussaud in 1809, accompanied by the sound of his (supposed) thoughts.

As the visitor moves through the house, so the story unfolds. The soundscape and imagery are all controlled by a central computerised show controller (hidden inside a convenient Georgian cupboard). Different specialists contributed their skills, whether dramatist, radio producer, audio-visual artist, photographer, set designer, electronics engineer, even advertising hoarding manufacturer. This interacts closely with the design of the room interiors: some have been faithfully redecorated and refurnished as they would have been in 1801, employing the skills of a wide range of craftsmen, others are conserved but remain unrestored.

In the work to prepare the palace for reopening, there was a particular emphasis on physical accessibility. An access forum composed of individuals with a range of physical disabilities offered advice on most aspects of the project. A lift had been added on the outside (taking the form of the Georgian privy shaft that had once stood there), making this a unique historic house in that all visitors could easily reach all floors. Discreet ramps at the front door mean that all visitors can enter together. Tactile models are available, audio loops have been installed throughout, transcriptions and large print versions of texts are available to borrow. Touch screen computers are available in the People's Library (installed in 2007) offering information and background to visitors.

This was a designed and programmed undertaking: at each point, the questions were always what mood was this room intended to convey, what point had been reached on the emotional journey, how could the story be advanced and not diluted?

5.4 Does it work?

The ultimate test of presenting a historic property is whether visitors respond, find enjoyment, and, ultimately, learn from their experience. What was novel in presenting Kew Palace was the single-minded approach that was taken.

Almost as soon as the first visitors came to see the palace the process of evaluation began. A wide range of methods was used:

- Structured surveys by interview questionnaire
- Visitor observation to assess dwell times and the level of interest exhibited
- Mind-mapping exercises on expectations and outcomes
- Emotional journeys assessed through audio recording of visitors' comments as they went round
- Surveys of both staff and visitors to map expected and actual learning outcomes
- Analysis of written comments in visitor books
- Follow-up telephone surveys to gauge the depth of learning and experience.

The data shown in Table 6 were used in the evaluation. The palace was very successful in its first year of opening, attracting in excess of 70,000 visitors (well above the target numbers). The novelty of the experience and widespread press publicity for the reopening was considerably assisted by the fact that the Queen's eightieth birthday party was held at Kew Palace on the eve of its opening. One unexpected result was that the average age of visitors was relatively high and more came in organised groups than as singles or pairs.

Data type	Source
Visitor numbers	Records maintained by Kew Palace staff and Royal Botanic Gardens Kew
Visitors' comments	On-site visitors' comments book
Visitors' comments	Letters sent to individual members of staff at Kew Palace
Visitor profile and comments	Market research (Project Victoria)
Visitor profile and responses to the re-presentation of Kew Palace	Kew Palace 'Re-presentation Evaluation Project' carried out in July 2006
Staff and volunteers' comments	Feedback forms completed by visiting staff and volunteers
Kew Palace and Historic Royal Palace staff comments	Interviews with Kew Palace staff and other Historic Royal Palace staff involved in, or associated with, Kew Palace
Staff comments	'Ask the Curators' book
Press commentary	Compilation of press cuttings from June 2005 to September 2006
Assessment of the Official Guidebook	Interviews with staff and visitor survey

Table 6: Data used in the evaluation of Kew Palace.

The overwhelming response of visitors was positive. Using methods developed by MLA (Museums, Libraries and Archives UK) in their ‘Inspiring Learning For All’ framework, visitor comment books were analysed for trends, messages, and direction. Visitors were asked a short series of questions on selected days. At other times, more sophisticated techniques of capturing responses were used, discussed below. On almost every measure, quantitative or qualitative, in excess of 90% of visitors gave ‘very good’ or ‘excellent’ scores or demonstrated that they had acquired new knowledge as a result of their visit. Perhaps as importantly, the great majority acknowledged the emotional quality of their response to the story through the range of interpretative devices used.

Where opinion divided sharply was over the audio. Although most were at least intrigued and often enthused or emotionally moved by the ‘radio play’ approach, a sizeable and vocal minority did not like it. Some hated it.

An older age profile of visitors made an audio-based mode of interpretation difficult for many, whether because of unfamiliarity, the restrictions it placed on the ability to exchange views or – probably most important – because of increasing hearing loss with age.

Nobody ever commented on the use of information technology itself, but many commented on its effects.

Analysis of letters sent to the palace, and sometimes to individual members of staff or volunteers in the rooms, illustrate how staff and volunteer engagement with the visitor supports the storytelling process.

Historic Royal Palaces undertakes regular visitor surveys through its commissioned market research company. Kew was involved in the process for the first time in 2006. The research addressed issues such as the demographic profile of visitors; their behaviour; marketing, communications and motivations, and key performance indicators – perceived value for money, enjoyment and staff helpfulness – as well as some deeper questions on the depth and value of their experience.

With the exception of the physical interaction question – possibly explained by the lower staffing levels in rooms for this first year of opening – the values are high and consistent with other data.

Some of the most interesting and deepest work was in an intensive research exercise involving structured visitor interviews, mind-mapping and observed visits. Although this is a labour-intensive exercise, the results are rewarding.

Subject of question	Per cent considering Kew Palace excellent or good in this regard	Mean rating (where 1 = good)
Information to explain features/ exhibits	81	1.07
Information about the people that lived at Kew Palace	84	1.12
Appreciation of what living at Kew was like	80	1.04
Physical interaction	58	0.69
Engaging your emotions	78	0.99
Engaging your mind	81	1.01

Table 7: Types of question asked in the visitor survey of Kew Palace.

In the structured survey, 96% classified their visit as ‘excellent’ or ‘very good’; only 2% classified their visit as ‘poor’. The main themes arising from the visitors’ responses were:

- Positive comments on the decoration, particularly where the visitor had seen the TV documentary on the palace project
- Mixed views about the level of information within the palace

- A generally positive reception to the display of the unrestored second floor – visitors making negative comments were usually seeking further information about it
- A generally positive response to the written information, although more factual information was required by some
- A mixed response to the audio-visual interpretation – some visitors considered that this feature enhanced their visit whilst others found it intrusive and irritating.

Three areas were identified by the researcher for exploring learning outcomes:

- King George III and his family (82% responding that they had found out something new)
- George III's illness (66%), and
- The structure and decoration of the palace (89%).

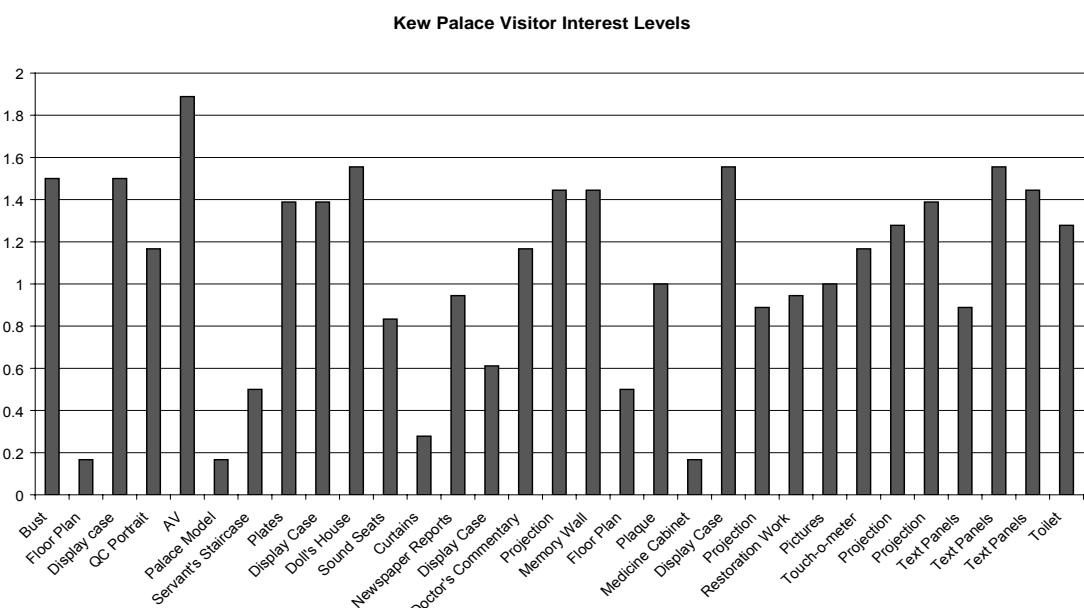


Figure 46: The level of interest exhibited by visitors during different stages of the Kew Palace tour.

New or surprising discoveries included the size and closeness of the family, the scale of the palace, the aesthetics of the decoration and the high standard of the restoration.

Fifty-six per cent of visitors felt that there were topics on which they would like further information, in particular the daily life of the palace, the restoration process, and the family. Ninety per cent of respondents classified information presentation as 'excellent' or 'very good'. The most divergent views concerned the voices in the audio presentation, which were classified as 'poor' and 'excellent' each by 16% of respondents. Written information was generally viewed positively, although respondents did request more factual information and larger typeface on labels.

Some visitors consented to be observed during their visit. Average dwell time for observed visitors was 41 minutes 19 seconds. Average dwell time in the Welcome Centre was 4 minutes 27 seconds (although the survey was undertaken during a very hot period). Thirty-one particular points of interest were monitored throughout the palace. Highest levels of interest were expressed in the audio-visual presentation in the Page's Waiting Room (89%), the display cases in the King's Library (61%), the Queen's Anteroom (61%), and the King's Breakfast Room (50%). Lowest levels of interest were in the floor plans, a model of the

palace in the Page's Waiting Room, the curtains in the Queen's Boudoir and the medicine cabinet in the Queen's Bedroom. The results are charted below.

Mind mapping techniques used with visitors – both this sample and others – prior to the visit and immediately after showed that participants had limited existing knowledge of the story or the likely house structure, and the second floor display made a particular impact in this respect. This was one area where information technology was cited as a topic of visitor interest or surprise. Visitors were surprised about the use of modern technology in a historic setting, and this elicited mixed reactions. As reflected elsewhere, there was a desire for more information about the refurbishment process. Generally, participants' desire for information about the royal family was satisfied, although there was an expectation that participants would find out about the daily life of the palace.

Beyond this work, a small sample of visitors agreed to record their interpretation of the palace during their visit on discreet audio devices. A 'low point' in visitors' tones of voice was noted in the ground floor hallway, and high points in the first floor and Princess Amelia's Dressing Room. A high number of comments were noted in the King's Breakfast Room and the first floor. Although this technique was very limited in its application and is still perhaps in its infancy, the immediacy and directness of the commentary is potentially an invaluable tool.

The charts shown below give the profile for three visitors. Their emotional and physical reactions are plotted throughout their journey within the house. Some are more volatile in their reactions than others. This is proving to be both an intense evaluation tool and important in planning future presentations.

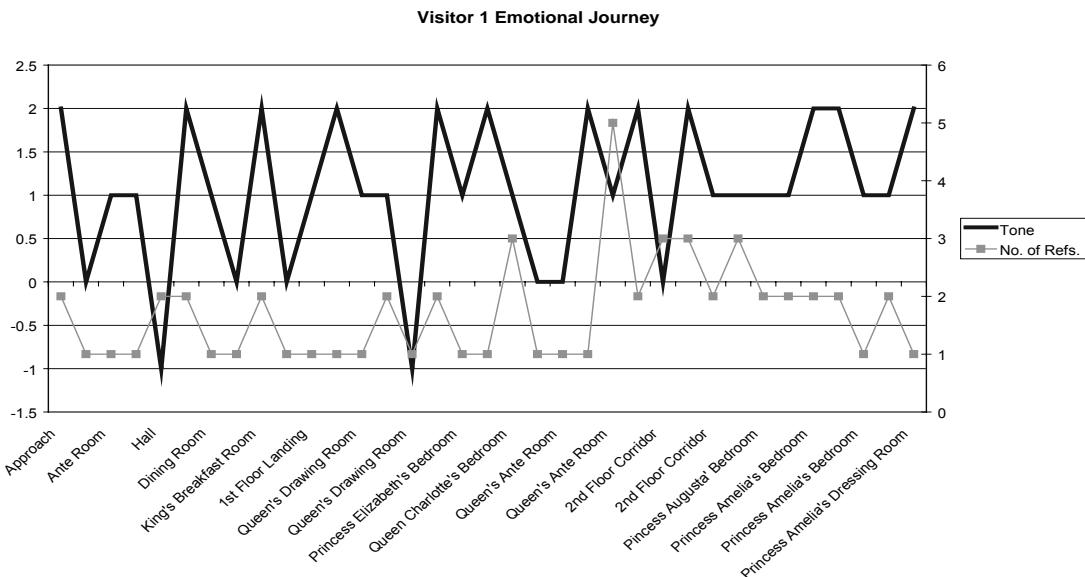


Figure 47: The emotional profile for sample visitor 1.

A wider and further range of evaluation was undertaken with staff, both the many staff from other properties who had visited Kew Palace and with the staff engaged to work in the house. This was a valuable exercise in itself, both for promoting the cause of a new way of thinking and presenting, and for identifying visitor responses and reactions that were not gained in other ways.

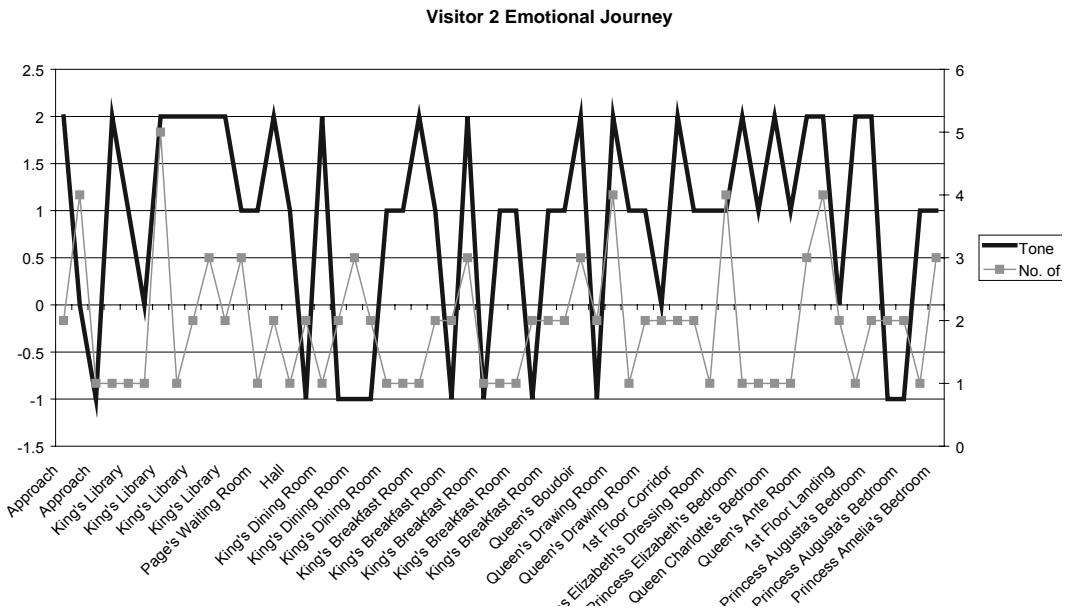


Figure 48: The emotional profile for sample visitor 2.

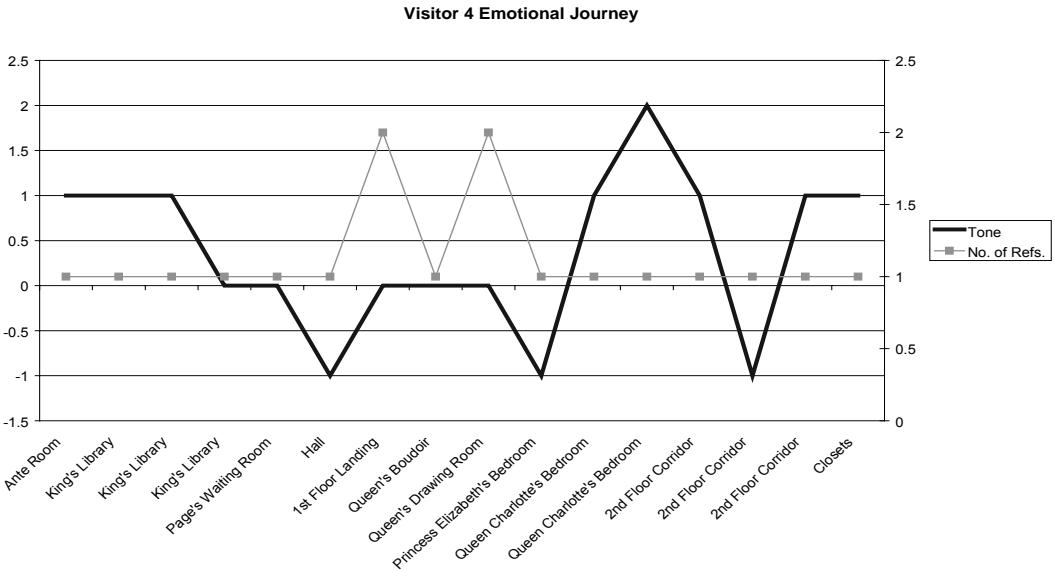


Figure 49: The emotional profile for sample visitor 4.

Overall, the range of evaluation techniques used was mutually supportive in its outcomes, but the more sophisticated techniques inevitably threw clearer light on certain topics. The responses were overwhelmingly favourable. The ‘bravery’ of the re-presentation project had borne fruit. Storytelling, which had been at the heart of the endeavour, was seen as paramount and successful by the great majority of those who came. For many visitors this was a journey of the emotions.

5.5 The lessons of Kew Palace

As ever, the first lesson is that you cannot please all the people all the time. However, there are many more practical lessons from the design and operation of Kew Palace. Above all else, there is the importance and effectiveness of story, using every approach available towards gaining both understanding and emotion.

The travails of monarchy are alien to most people; everybody has a family, and every family undergoes some form of crisis in its history.

It is now a commonplace that historic properties need to respond to the range and combination of different learning styles, but in most cases there is still primary reliance on the written word. Using a range of approaches that respond to the range of learning styles has a cumulative effect. The project team had many arguments along the way: was it ‘appropriate’ to use a form of presentation that is alien to a historic house in advancing the story, whether that be wall-mounted lightboxes, artists’ installations or shadowplay on walls? The answer became clear: if it advanced the story and served the emotional journey then it was appropriate, and if it did not do that then it should be jettisoned. Visitors only stop to ask if something is ‘appropriate’ if it fails to fit.

Allied to that, the use of information technology took back-stage and was mainly kept discreetly out of sight. A few visitors will thrill to the fact that Cat 5 cables can be used to carry all the digital signals whether audio, video or combined; most will be totally indifferent.

The biggest lesson is that you can be brave. Not every historic house could or should be a Kew Palace, but where the techniques work then we should let them take their course. You can mould, even manipulate, the emotional responses of visitors. You can tell one central, compelling story, and find alternative ways of telling the many other stories that always crowd in. You can follow one principal means of delivery and be content that although you will not succeed with everybody you will have added to the enjoyment of most. You can use a wide range of techniques and employ a range of artists and consultants and find that it fits together. You can go for maximum accessibility and provide benefits for all. You can even paint historic interiors bright pink and bright green, and get away with it on the grounds of authenticity.

The lasting question is whether the presentation of Kew Palace will stand the test of time. How can the experience be refreshed? How can elements be changed and not upset a contrived whole? If its techniques are widely copied will it lose its impact? Those are issues that are being actively addressed as the experience of opening and operation continues. For the moment, we can both learn from and enjoy the radio play inside a doll’s house.

Acknowledgements

The restoration and re-presentation project was supported by the Heritage Lottery Fund and other donors. The Kew Palace project team was led by Jo Thwarts of Historic Royal Palaces. Most of the contents of the Palace are items from the Royal Collection.

Design master planning was done by Metaphor, the dramatist was Jerome Vincent, radio production was by David Blount and Pier Productions. Audio-visual design was by David Bickerstaff, NewAngle. Cabling was provided by HRP, hardware design and installation by Sysco, graphic design by Robert or Lucy, showcase design and manufacture by Netherfield, lightbox design by Gentleman Jim, photography by Robin Forster, and construction management by Gardiner & Theobald. Evaluation was undertaken by Julia Parker, BDRC and Rachael Smith. Filmed documentation of the project was produced by David Allen and BBC Wales.

6 The Interactive Storytelling Exhibition Project: A perspective on technology for interpretation

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The Interactive Storytelling Exhibition Project (InStEP) is a project originally devised to bring British Broadcasting Corporation (BBC) content into museums. It demonstrates a methodology for engaging public interest in heritage and historical artefacts using a virtual narrative through interactive storytelling. This paper describes the project evolution and the system paradigm. It also includes lessons learned from the system development, production, and implementation into a museum environment.

6.1 Introduction

The original brief for the project was born out of a public service broadcast production strategy known as ‘360 degree commissioning’. The strategy is devised to maximise audience reach, optimise production value, and provide better service and viewer satisfaction. Primarily, ‘360 degree commissioning’ considers media production across every available media platform and extending an internal paper (Kent 2000) describes how BBC audience experience could be extended into other types of environment, such as a museum.

The InStEP project was originally conceived in 2004 as a pilot to extend the reach of a BBC1 series entitled ‘Egypt’ and was commissioned within the Interactive Television Factual and Learning Department of BBC Television. In early 2007 this department became part of the BBC Vision Multi-Platform Studio. The primary objective was to make BBC content more accessible in local areas as a free public service by collaborating with museum curators and local institutions. Secondary objectives were to:

- Immerse visitors in a public space exhibition using departmental core skills (technical and creative) and understand how existing skill-sets mapped onto creating immersive interactive exhibitions and interpretation of museum artefacts in a new and innovative way.
- Identify types of content appropriate for this kind of approach
- Re-use existing BBC production assets for a new purpose
- Design something scalable to fit within a variety of spaces
- Establish and strengthen relationships with museums and galleries
- Establish an editorial approach to develop into a flexible software template for future interactive exhibitions
- Build an innovative system using affordable ‘over the counter’ technologies
- Establish main drivers for telling interactive stories in three-dimensional space
- Fit with other BBC content primarily BBC1’s ‘Egypt’ programmes and bbc.co.uk/history
- Develop the system in a user-centric and iterative way.

6.2 Museum context

For many years, museums have made use of computer-based interactive applications to interpret artefacts and collections to visitors. In recent times, the impact of technology is extending beyond the museum doors as demonstrated by the creation of virtual museums online and increased public use of the internet. The extension of visitor experience beyond the museum environment into the home, as described in ‘Creating a virtuous circle between a museum’s on-line and physical spaces’ (Barry 2006) is an expression of a need for museums to extend their reach outwards from the museum. This exploitation of media to engage museum visitors by museums provides an interesting counterpoint to the 360-degree commissioning strategy and the BBC intention to find new ways of collaborating with museums and curators in the community.

In order to achieve successful museum experiences within the paradigm described in the BBC objectives above, the engagement of visitors at all stages of the journey is critical. Current efforts around interaction with specific exhibits often involve stand-alone systems, with the notable exception of handheld or kiosk-based on-demand guides. Interactivity in most cases is limited to requiring the visitor to press a button triggering a response on a screen or an audio system. Hence, there is a need to improve the interactivity as well as to strengthen the connection between the use of interactive technologies and the artefacts in the exhibit, so technologies can enhance the experience, rather than becoming the experience themselves.

Interactive storytelling and gaming can exploit digital technologies to provide a new level of engagement within collections, exhibits and even locations. Hence, interaction between the visitor and technology can enhance the interaction between the visitor and their surroundings.

6.3 Interactive television versus museum

From a museum perspective it is of key importance to place the visitor focus on location, artefacts, and collections. The objectives for the BBC have been described and require the presentation of interactive television content relating to a BBC series about Egypt and a variety of associated media-based stories. The project aimed to provide a context for museum collections within a compelling interactive storytelling environment.

In the final work visitors explore the exhibition environment to uncover facts and information relating directly to the television story in which they play an active role. As such, interactive television content relating to a BBC series about Egypt and a variety of associated media-based stories were key assets for the project.

6.4 The InStEP system architecture

The design process paid respect to the needs of the museum as the host and the visitor as a user. An iterative user-centred approach was undertaken, following a model of paper-based prototype, proof of content and interactivity, testing, evaluation, production of a prototype interactive environment, testing with an invited audience, evaluation and improved production for a pilot public exhibition. Visitor feedback steered the focus for system functionality and degrees of complexity.

The unique selling points of the system identified in the prototype provided focus for the development of the pilot system. Primarily this was the fact that the system recognised each visitor as an individual with an apparent magical awareness of their place in the story and record of the user’s real-world activities (using RFid technology). Other highly valued feedback from the early stages of development highlighted the need for clear instructions and only short bursts of narrative with minimal information in a story context. It has been well documented that museum visitors will not read the clearest and most important looking text, be it on screen or on an information board. Thus, screen characters also provided instructions

for visitors engaged in the activity combined with audio, and backed up by on- and off-screen text-based cues.

The crucial balance between on-screen content, real-world objects and activity was assured by creating an interactive system which locked users out, obliging them to move away from the interactive screen and look around for clues in the exhibition.

The media platform behind the system is based on reliable open source internet delivery technologies, including Linux, Apache, My SQL and PHP, running on Windows client machines with a Microsoft Internet Explorer 7.x browser to display games, video and audio within a high definition 1024x768 pixel resolution interactive touch screen environment. The system exploits Radio Frequency (RFID) identity tag technology in the form of a user-registered magnetic card to personalise the experience. Software architecture was specified and contracted to a contractor.

6.4.1 User journey, system architecture and hardware

The pilot interactive environment consisted of a network of interoperable computers, providing a software platform to run the interactive environment. The network comprised (but was not constrained to) five personal computers known as ‘stations’: One central computer (the ‘server’) and four outreach ‘client’ computers (one of these client machines is identified as the ‘registration’ machine). The visitors make the journey starting at ‘registration’ they may then use any ‘client’ machine.

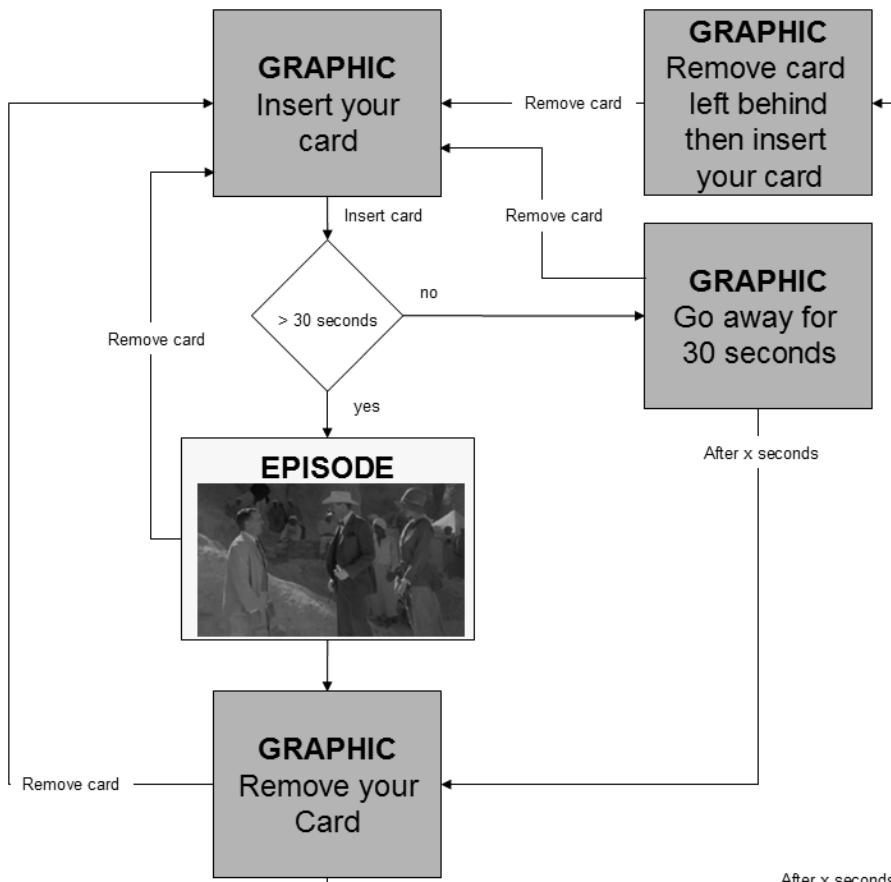


Figure 50: InStEP system logic functionality and graphic display.

Each visitor (or group of visitors) registers by entering a user name which is associated with a unique Radio Frequency Identity tag (RFId) in a system database, thus same names may be entered and still receive a unique system identifier. The server holds data about users and the user journeys between stations and each station delivers the content dependent on the identity and needs of the visitor. For example, when a user introduces the unique identifier, the system plays the appropriate episode of the virtual narrative for that user (or group) over the network. At the end of each episode the special feature of the system known as the ‘kick off’ and ‘lock out’ feature, ‘kicks the user off’ the system and ‘locks them out’ for a timed period (adjustable at each client machine). This feature requires the visitor to interact with the real-world exhibition.

The server stores user journey data from every individual visitor or group from registration to completion of the interactive journey. The system exploits Radio Frequency (RFid) identity tag technology in the form of a visitor-registered magnetic card to personalise the experience. Each sub-station will recognise RFid tags at a maximum proximity of one centimetre. The network of computers is scalable to accept a greater number of interactive ‘stations’ as required.

All sub-stations include hardware and software to either ‘trigger’ or ‘play out events’ (one being the switch - caused by the presence of the visitor). The latter being the screen-based interactive journey, which was triggered following visitor recognition via the RF identity tag. These included: audio files, video files, synchronised video and audio files, Adobe/Macromedia Flash, QuickTime VR, VRML, peripheral applications, and Mix TV (a.k.a. Augmented Reality) i.e. any application which can play in the client machine Microsoft web browser. Thus a story narrative is produced through a series of user interactions with and beyond the system.

6.5 The visitor interactive journey

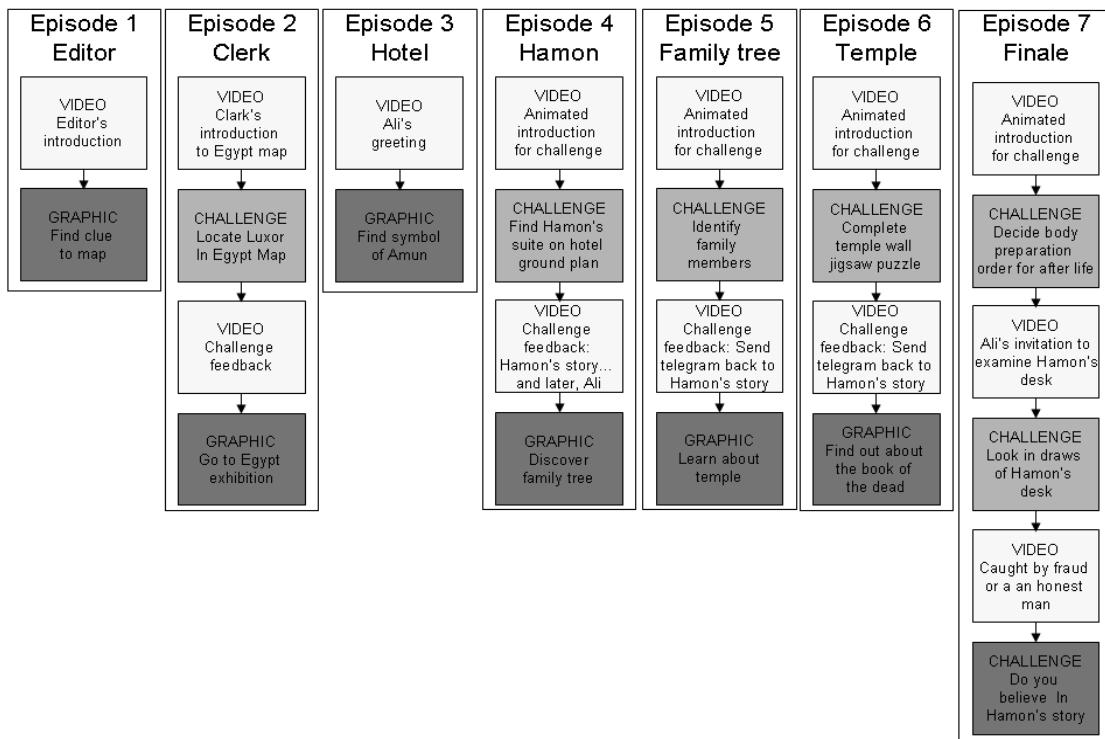


Figure 51: Seven episodes of content from the BBC Egypt InStEP narrative.

6.5.1 Storytelling

An Indian proverb says: “Tell me a fact, and I’ll learn. Tell me a truth, and I’ll believe. But tell me a story, and it will live in my heart forever.” This emphasises that storytelling is a powerful mechanism to communicate information about a museum collection in an engaging and entertaining way.

A story approach was chosen as an effective way of communicating information about Ancient Egypt to visitors. A major challenge was to convey a complex story based entirely on real life events set in 1923 to include game play and guarantee learning outcomes about Ancient Egypt.

Learning outcomes were identified following study of a variety of museum Egyptology collections through museum visits and referring to teacher information packs.

6.5.2 Learning outcomes

For the first implementation of the project key ancient Egypt learning outcomes were identified:

- Egypt is in Africa
- Ancient Egyptians worshipped many gods
- Pharaohs ruled Egypt for thousands of years BC
- Ancient Egyptians believed in a life after death
- Ancient Egyptians had very superstitious beliefs
- Using these five learning outcomes games were devised and fitted into the back story mostly set in 1923 at the time of the opening of Tutankhamun’s tomb.

6.5.3 The story layers

The story is composed of four layers, each inspired by true stories and real-life characters:

- The role-playing visitor: A journalist in search of a story working for a tabloid newspaper editor living in 1923.
- The story of how mysterious Count Louis Hamon a.k.a ‘Cheiro’ (whom the visitor is investigating) came to meet with the spirit of King Tutankhamun’s undead half sister in October 1922. This story is from an account in his book ‘Real Life Stories’ published in 1934.
- The discovery of the tomb Tutankhamun by Howard Carter and Lord Carnarvon’s sale of exclusive copyright to images of tomb treasure to the London *Times* newspaper, and his death shortly after entering the tomb.
- The life and times of Tutankhamun.



Figure 52: Count Louis Hamon 'a.k.a. 'Chiero' with the mummified hand.

6.5.4 Visitor experience

The story is set in the early 1920s at the height of 'Egyptomania'. As an introduction, visitors are immersed in the period using mixed media, 'set' and 'dressing' from the BBC1 series production, audio-visual media, and posters. Strong reference is made throughout to local newspaper coverage (according to the exhibition location) and superstitious beliefs surrounding ancient Egyptian artefacts. Key information is the fact that archaeologist Howard Carter's sponsor Lord Carnarvon sold exclusive copyright of the story surrounding the opening of King Tutankhamun's tomb to the *Times* of London. As the story becomes hot news the copy hungry tabloids are looking for new angles. The television narrative is based on accounts from the period and real-life characters. Visitors are offered the chance to become a tabloid reporter and follow up an exciting 'breaking news' story about a curse connected with the tomb's opening.

6.5.5 System interface

Visitors undertake a simple computer-based registration process in which they identify themselves by name and are issued with an 'International Press Identity Card'.²⁷

On presentation of the card to a card reader at the first interactive screen visitors meet the 'Editor' – a character who sends them on a mission to Egypt to get a scoop for his newspaper. He has heard about a curse threatening the team about to open the tomb. Card holders are given a lead and they start the mission. Each part of the story from here on has a challenge and knowledge-based game linked to it. The users complete the challenge, in the real world, do the on-screen game (to prove they have done the challenge), and continue further into the story. The games drive the narrative and the narrative informs the games. What is unique about the system is the fact that users complete the challenge away from the television screen in the context of the exhibition space only returning to a screen to prove the challenge is complete and continue the story. Each challenge has learning value and is linked to ancient Egyptian history, with a thread and story of its own.

²⁷ A single card can be registered to an individual or to a 'familiar group' depending on the interactive screen viewing constraints – size and access to audio. A group may comprise as many as six individuals. The card identifies the visitor/s to the system using RFid technology enabling the system to deliver appropriate content on demand from any interactive terminal.



Figure 53: The press identity card (RFid token) face and back.

After completing five games users are in a position to decide whether they feel there is any truth in the curse story. For the climax, exhibition visitors must choose a headline for the paper to get the scoop they set out to find for the tabloid editor. Before they leave the exhibition they must return the card and collect a personalised newspaper ‘front page’. This is printed out by the system as a ‘take away’ and it includes the information gathered about the stories researched, one of three selected ‘head lines’ and the correspondent’s name (or group identity) at the top.

6.5.6 Interactive games and exhibition integration with artefacts

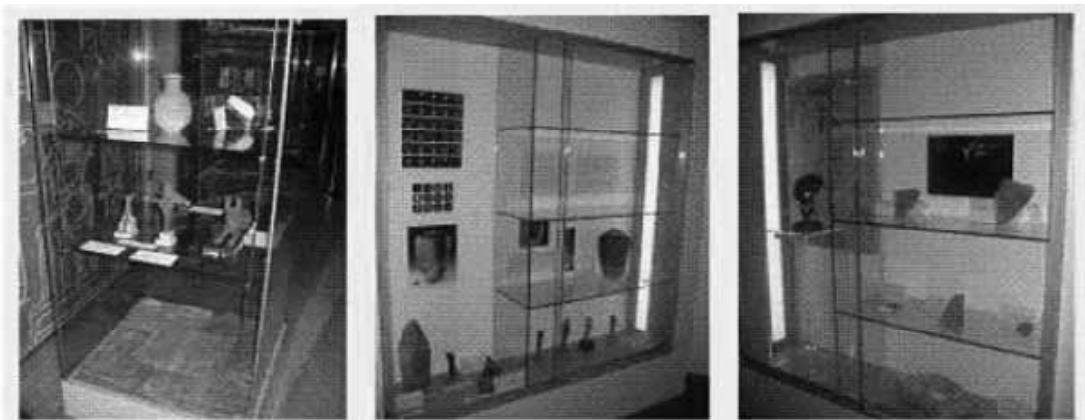


Figure 54: Exhibition cabinets with information boards providing clues.

Games are seen as primary interactions and the narrative as a link between game activities. The paradigm of ‘kick off’ can be seen as a third level of engagement where the focus shifts from screen interaction to engagement and interaction with the physical museum collection. Exhibition cabinets provide story context through relevant artefacts. Thus, during research ‘kick off’ activity visitors come across ancient artefacts close to the information boards carrying the clues to answer their interactive quest.

Each game theme has two key requirements: first, it needs to fit with the needs of the story, and second, it needs to fit with generic interpretation themes and learning points. The games are:

- *Key locations in Egypt:* This is a hot-spot map where the visitor is required to locate Egypt in Africa, and Luxor as the town nearest to the Valley of the Kings out of four key sites in Egypt: Giza, Amarna, Luxor, and Abu Simbel.

- *Gods of Ancient Egypt*: This game challenges the visitor to identify the god Amun on a hot-spot plan of the hotel where the suites are named after the Egyptian gods. By identifying the right suite/god they will find the where ‘The Count’ is staying. Museums can display any artefacts with reference to Ancient Egyptian gods. In this case, the exhibition contained a cabinet with a variety of artefacts, figures and depictions of gods. The added learning value from this game is the understanding that the ancients Egyptians worshipped many gods, until Tutankhamun’s family decided there should be just one god.
- *Family tree*: in this ‘drag- and-drop’ game the user needs to be able to recognise key members of Tutankhamun’s family to complete the Tutankhamun family tree. Especially important is the fact that he married his half sister. Museums generally carry a dynastic timeline. Learning outcomes here include the concept of the modern era AD/BC and the epic timescale of Pharaonic rule. Any artefacts relating to Pharaohs or the royal family can be exhibited here as they will fit with the dynastic chart.
- *Desecration of the temples*: This ‘drag-and-drop’ game illustrates the story of the power struggle between Tutankhamun’s family and the powerful priesthood of Amun. This is to prove the workings of ancient cursive behaviour. Artefacts, especially relating to Amarna and Akhenaten and Amun, show evidence of curses or superstitious belief. This is evidence that Tutankhamun’s family were despised by some people who wished to curse them and obliterate their memory. The ancient story of this desecration is a classic tale for the enjoyment of the more mature and academically engaged visitor and which is still being researched by archaeologists today (this was removed from a later installation at Torquay Museum).
- *The ‘Book of the Dead’ and the afterlife*: This drag-and-drop game requires the user to understand the concepts laid out in the ‘Book of the Dead’ (which changed greatly over 3,500 years). In an overview the book describes the journey from death to the afterlife (mortality to immortality). The user has to check the order of events and requirements for entry to the afterlife. Any artefacts relating to death and the journey to the afterlife are useful here: mummified remains, shabti figures, canopic jars, Osiris, Anubis, etc.
- *Curse story true or false?* This game is built using Adobe Flash; the screen activity brings the user back into the role of undercover reporter searching through a virtual desk. Each drawer contains information to help the user form an opinion on ‘The Count’ (i.e. are his stories true and can he be trusted?). The exhibition context for this can be of Egyptomania (the introductory context) and the newspaper coverage of the death of Lord Carnarvon. The user must decide if the death could be related to a curse on the evidence from ‘The Count’.
- Whilst not strictly a game, the final user interaction with the system is to make a choice of newspaper buy line and front page. The user chooses one of three options presented on screen and the system prints the chosen response which includes the registered username as author.



Figure 55: Interactive screen games - Map, Family tree, and ‘Headline choice’.

Games mainly use two different styles: ‘Hot spot’ multiple choice, or ‘drag-and-drop’, where the sliding plates only stick in only the right places, be it a family tree picture or jigsaw puzzle piece. Feedback is

given on incorrect actions, bringing up a ‘factoid’ about the wrong answer as another learning point. Hot spots and drag-and-drop are simple HTML-based games.

6.5.7 Exhibition implementation

The pilot interactive environment was based on a temporary exhibition with Egyptian artefacts loaned from Birmingham Museums and Art Galleries and Birmingham University’s Department of Archaeology and Antiquities. This first public implementation of the project ran for six weeks in BBC premises in Birmingham, and coincided with the broadcast of the drama documentary series ‘Egypt’.



Figure 56: A school group enjoying the exhibition in Birmingham – playing with and then locked off an interactive screen.

Both exhibition and pilot interactive environment went live to the public on 31 October 2005 in the BBC Birmingham Public Space in Birmingham, UK. The launch of the exhibition was concurrent with the first transmission of the series ‘Egypt’ on BBC1 and ran until 4 December 2005, the day of the final transmission.

Museum curators and interactive exhibition specialists across the UK were invited to ensure feedback from a suitable cross section of public and professionals alike. Critical evaluation in the form of a short questionnaire offered to visitors was made by the production team to assess outcomes relating to the project objectives and further independent evaluation was made by BBC Creative Research and Development with specific reference to visitor experience and learning potential. A summary of the results of these evaluations is presented in the following section. Following the success of the first exhibition, the pilot content has been re-versioned for Torquay Museum and was installed in spring 2007 with a five year licence granted.

6.6 Usability and acceptability visitor evaluation

The pilot Interactive Environment was evaluated to find out the acceptability of visitors to the overall experience as well as the usability of the system. The evidence was collected from visitors using a combination of different types of methods, including observational techniques:

- Observation, shadowing and hidden cameras to observe visitor behaviour and comment as well as one.
- One-to-one interviews with educationalists about learning in museums.

The questions were based on interview guides designed and tested by the MLA project ‘inspiring learning for all’ (Museums Libraries and Archives Council 2005) and on a guide for museum evaluators (Gammon 2000). Three types of structured interviews were carried out with a range of visitors, including teachers, family groups, friends, and individuals.

- A pre-visit one to one interview focused on why they had come and on their expectations for the exhibition.

- A post-visit one to one interview targeted different visitors and focused on their experience, learning, and ideas for future exhibitions. In addition, anonymous.
- Anonymous questionnaires were given to all visitors. For younger students, there was a student survey which pupils completed after their visit - this was a simple tick box questionnaire based on MLA research and a more freeform drawing of their experience. There were two questionnaires one for those under ten years old and one for those over ten.

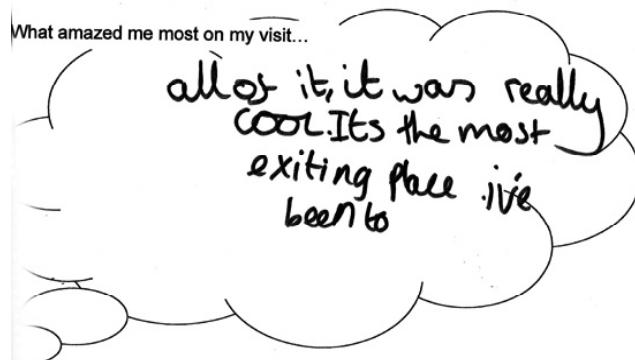


Figure 57: Completed feedback sheet.

At interview one teacher expressed delight that all her students did exactly what they had been told (by screen characters), further to this she added how effective the on-screen characters are in motivating young people to undertake activities.

From the total number of visitors registered, which was of 468, the feedback sample was approximately 164 persons plus pupils. The number of visitors observed was far greater, although some of the hidden cameras did not work all the time. In total approximately 30% of the visitors provided some type of meaningful feedback.

This testing demonstrated that the narrative worked well. Visitors, especially children were almost unanimous in saying that they enjoyed the exhibition, that it was an exciting place and the visit made them want to find out more. People liked the interactivity of the experience most and the interesting content as well as being a fun activity.

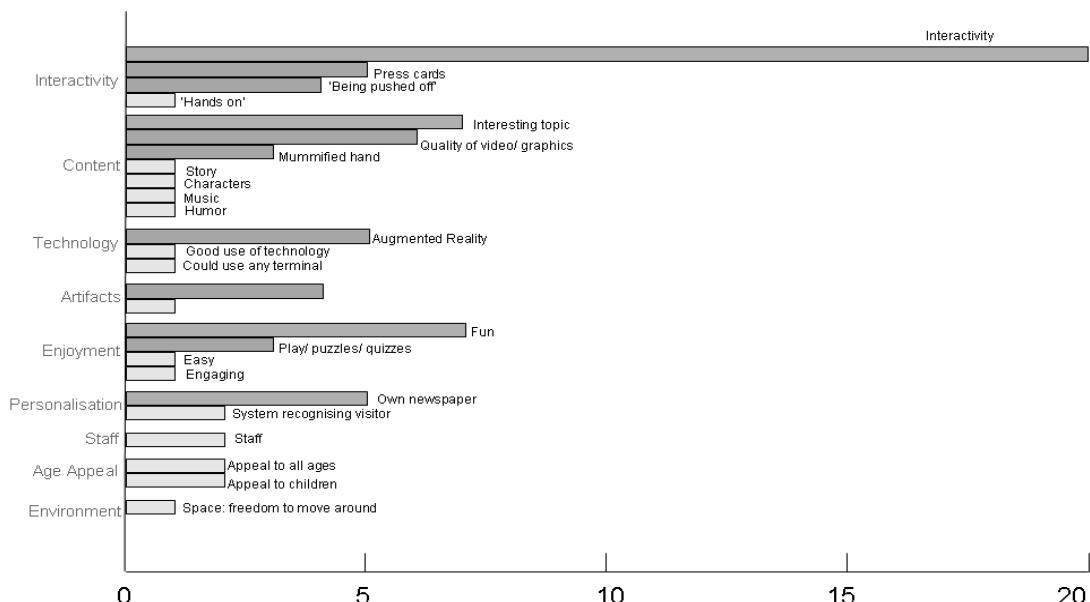


Figure 58: What people liked about the exhibition.

This suggests that visitors enjoy themselves more having an interactive experience rather than just passively looking at the artefacts.

Interactivity means that visitors are encouraged to actively look for information and look at the artefacts to continue their experience. This type of interactivity strengthens the connection between the technologies and the artefacts.

Using challenges to complete and advance on the story proved more adequate for some visitors. The templates ‘drag-and-drop’ and ‘touch the screen to identify or make a choice’ games were considered by a few to be too simple for an audience knowledgeable on the subject, but suited the younger visitors very well. Visitors with more knowledge responded well to the game presented in Flash, which provided a more complex environment to explore. However, it should be noted that the simpler games can be produced for 25–30% of the cost of the same game built in Flash. Also, Flash games require the host system to have the Flash player installed and there is an initial cost associated for a developer’s licence.

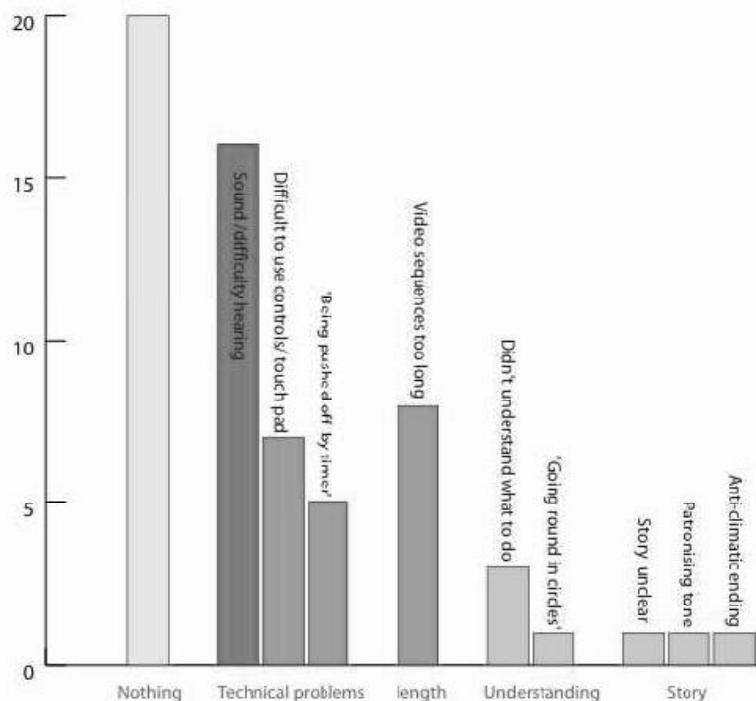


Figure 59: What people liked least about the exhibition.

It is not surprising that interactivity scores highly in the evaluation, as this issue has been already highlighted by others studying the incorporation of technology in museums (Gottlieb 2005). However, the fact that content scored highly in visitors’ favourites suggests that people become more engaged with the experience if what they are being told and how they are being told is interesting for them. In this case, telling the story of the curse and the opening of King Tutankhamun’s tomb proved to be a successful way of engaging people with the museum exhibition. Despite this, some visitors, especially younger children found the story a bit complicated suggesting that different storylines might be more adequate for different types of visitors. For this reason, the content has been edited for the second implementation.

Being truly engaged with the experience enabled people to enjoy themselves and have fun while learning about Egypt. One respondent reflected this by stating “Interactivity makes the whole learning experience lots of fun”, while another stated “The interaction between the objects, story, character and quality of screen video was fantastic”.

Furthermore, when people were asked what they liked least the greatest number of visitors said there was nothing they did not like. Technical problems scored highly in the list, mainly sound reproduction

and controls that were difficult to use. These problems were unavoidable at the pilot exhibition without resorting to headphones or specialist directional sound technology. In addition, a few commented on the length of video episodes (between forty seconds and nearly three minutes) without a break for a game or interaction. It was considered that one minute thirty seconds is a maximum for a standing audience at a screen. Any longer than this turns a video into a proper television experience bringing with it a need to be seated and an involvement in the screen and narrative which is probably not appropriate for an experience of this type. Another issue is that people get uncomfortable when they do not know how long something will last. Exhibition designers will often explicitly state that a video sequence will be three minutes or five minutes so that people are prepared and their thoughts do not drift into wondering how long they will have to give their attention. Further testing is planned to evaluate the validity of these results.

6.7 Other implementations

Looking at the feedback it is the youngsters who are seen to respond with the most enthusiasm – and adults on their behalf. The evaluation study, whilst not comprehensive played a large part in the following revisions to content and development of a new interactive exhibition using the InStEP system.

6.7.1 Content revision

According to the original aims for the project, the system was developed in parallel with an authoring environment. Thus on completion of the project a template authoring, testing and publishing tool was available on completion of the project for subsequent interactive story production. The tool also enables creation of new HTML-based games, editing of existing media functionality and narrative flow. To-date two systems are in existence one using the existing Egypt content on permanent exhibition in Torquay Devon and a second with 100% new content for Brighton Fishing Museum:

Torquay Museum

Torquay Museum Explorers Gallery houses a cut down version of Egypt as displayed in Birmingham. A number of content changes were made:

- The first content change made was to the location of the Gazette newspaper offices in graphics files, changed from Birmingham to Torquay.
- A further amendment was made in light of the user feedback, namely the experience was shortened by removing one episode. Because of the complexity of Episode 4 of the story the ‘Desecration of the Temples’ for younger users it was removed. However, the narrative still works well in spite of the loss of an entire episode.
- The exhibition space has been designed to reflect local stories within the context of the interactive narrative and fit with the Explorers Gallery theme.
- Also seats are provided for users to watch video and make screen interactions. Closed caption subtitles were also added to address access issues.

Brighton Fishing Museum

To prove one original aim, the Egypt content was replaced with content on a different theme. Three MSc students from the University of Brighton devised a theme and created content for implementation in the seafront Fishing Museum. In response to recorded feedback from the Birmingham pilot students created a fantasy story involving a younger ‘peer group’ character, a nine-year-old girl called Lucy caught in a time warp at the Fishing Museum. On entering the museum Lucy finds herself caught in a time warp and asks for the visitors to help her get back home to her own time. Visitors must search the museum to discover time keys and help Lucy travel forwards in time and finally home. Each key is linked to a

learning outcome and screen-based game created from the templates devised for the Egypt project. Whilst the story is not itself rich in learning, as a vehicle and motivator for the users it works well, and includes strong dramatic feeling and empathy through the characters for user enjoyment.

In addition, usability studies are planned for Torquay Museum and Brighton Fishing Museum. This will include quantitative and qualitative analysis and a study of this system to engage students with cultural heritage by creating a museum experience. Thereafter, the most natural next direction will be to create the next interactive storytelling exhibition. A challenge for the future is to find the characters and stories that cut through and across (heritage-based) collections, including characters that link place with people and objects.

At Brighton Fishing Museum each of the video elements is shorter and the story contains fewer on-screen characters. The whole offering is as focussed on driving the visitor experience in the exhibition as it is in conveying directions rather than information, indeed learning points are almost exclusively achieved beyond the system and the system only serves to test the learning. The bespoke nature of the content also helped with development of the story, making it quicker to develop and more specifically relevant to the space in which it was implemented.

Because of the production budget constraints only two video locations were used to make the story. The fantasy element allowed for greater latitude in the stories and challenges and because of that the production was completed within a ten-week period. A study of the similarities and differences between the Egypt and the Fishing Museum project helped us realise some useful conclusions.



Figure 60: Screen shots from the Brighton Fishing Museum student project.

6.8 Conclusions

Lessons learned from the project highlight the need to aim an experience at a specific target group. Looking at the feedback, it is the youngsters who are seen to respond with the most enthusiasm to such a system. Therefore, this type of experience has good potential for engaging families and groups with younger visitors. Introducing a younger ‘peer’ character and removing more intellectual chapter such as the ‘Desecration of the Temples’ could also be beneficial. Hence, the paradigm of push off and lock out has proved to be a great success. This may be attributed to the user centred iterative approach in development, and because technology is not the driving factor behind the production team also perhaps the fact that the system development toolkit was built from first principles rather than using proprietary software with any associated templates and toolkits developed with generic applications in mind.

Many users enjoyed the interactive nature of the experience – without further questioning it is hard to make conclusions about which aspect of the interactivity they enjoyed in particular as the interactive is given to work at so many levels. Whilst there is no clear evidence of an increase in visitor engagement the fact remains that if they completed the experience the planned learning outcomes must have been achieved. Similarly there is no evidence in this research paper that visitor engagement with artefacts has been influenced for better or worse through use of the system.

For content development and user engagement it is clearly advantageous to aim an experience at a specific target group. Hence, the Fishing Museum implementation focuses the experience towards the younger audience allowing for clear aims in the story line, games, and real world activities.

Short video sections are more effective than long. If a video runs for longer than one-minute users may prefer and benefit from being seated.

Technological implementation is also an important consideration. Using television content in public spaces with soundtracks that need to be listened to is challenging. Excellent technology exists for this purpose and should always be considered as an option. Torquay Museum employs an enclosed headphone system that does allow for group activities (despite the addition of subtitles), which may be seen as a constraint on the system as a visitor and user experience is also a social one. It also reduces the ‘throughput’ of visitors.

In conclusion, the project has proven to be an effective way to communicate heritage in an engaging way by combining both the virtual and physical element of a museum experience. Hence, the InStEP paradigm works well to bring collections and location into a story context through a role-playing game. Everyone loves a good story and InStEP puts the user into the story. This immersive approach works well for engagement with content. The use of on screen characters is clearly an approach which brings advantage in motivating young people to undertake research based activities. On screen characters providing directions to visitors seems to work well. A challenge for the future is to find the characters and stories that cut through and across (heritage-based) collections.

6.9 Further directions

Further research into users would be of interest, especially in relation to proving the system value to museums and any location rich in learning. It has also been suggested that the paradigm could be exploited in training applications.

By data mining the system databases in Torquay and Brighton it should be possible to make a meaningful analysis of user behaviour in the museum spaces. This quantitative approach could be combined with a further qualitative usability study, especially exploration into effectiveness of user learning. This research could also assess which aspects of the interactive nature of the project were more effective and enjoyable to the user.

Further analysis of the difference in approach of system implementations would also be of interest – what are the key factors of success in an exhibition of this kind?

As the cultural heritage sector is always keen on finding ways of engaging young people with heritage study or the use of system as a tool to engage students with heritage by creating a museum experience is another potential direction for research.

Other further directions for the technical system development are laid out in a previous paper by the authors (Danks *et al.* 2007)

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References

- Barry, A. (2006) Creating a virtuous circle between a museum's on-line and physical spaces, in Trant, J. and Bearman, D. (eds.) *Museums and the Web 2006: Proceedings*, Archives and Museum Informatics: Toronto: <http://www.archimuse.com/mw2006/papers/barry/barry.html>
- Gammon, B. (2000) *Effective questionnaires for all*. South West Museums Council. Museum Learning Initiative.
- Gottlieb, H. (2005) *Visitors focus in 21st century museums*. V4M/The Interactive Institute: Stockholm.
- Kent, J. (2000) *How to build a human*, Internal Paper, British Broadcasting Corporation.
- Danks, M., Goodchild, M., Rodriguez-Echavarria, K., Arnold, D. B., and Griffiths, R. (2007) Interactive Storytelling and Gaming Environments for Museums: The Interactive Storytelling Exhibition Project, *Edutainment 2007*, Hong Kong.
- Museums Libraries and Archives Council (2005) *Inspiring learning for all*. <http://www.inspiringlearningforall.gov.uk/> (<http://www.inspiringlearningforall.gov.uk/> Accessed June 2007)

7 Evaluating the impact of new technologies on cultural heritage visitors

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As the use of ICT applications in cultural heritage institutions continues to spread, it has become clear that these applications have considerable effect on the kind of experience visitors have, and what they will learn and remember from their visit. Yet, systematic evaluation studies in this field remain limited, despite the considerable time and resources involved in creating these applications. This chapter explores the lessons learned from evaluation research at three different cultural heritage settings, in Italy, Belgium, and Greece. This work contributes to the building of a larger body of evidence of visitors' use of ICT exhibits and allows us to start drawing some general guidelines and conclusions about the impact of these tools and the conditions under which different applications might be suitable for particular types of users.

7.1 Introduction

The use of information and communication technologies (ICT) in the cultural heritage sector continues to widen. Apart from various socio-economic factors, cultural institutions continue to use and experiment with ICT in order, among other things, to create exhibits that communicate better with their audiences, encourage their active participation, and support informal learning. The increasing use of new technologies has also led to a growing interest in testing how effective these tools really are in supporting the aims of the cultural institutions and studying exactly how they function in the museum environment.

Although there are several evaluation studies of the educational effectiveness of ICT applications, these are primarily from formal educational environments, such as schools and universities (Economou and Pujol 2006). These offer interesting results, but tend to focus on specific cognitive gains and the comparison with traditional instructional strategies. Therefore, they should be interpreted with caution, as cultural heritage institutions constitute a different setting with some fundamental differences. Very little systematic evaluation research of the use of ICT has been undertaken so far in museums and cultural heritage sites, where learning needs to be defined in a broader and more holistic way. Additionally, the evaluation of the impact of new technologies should not focus only on learning outcomes, but should also include the complex set of parameters that affect their use, such as the social context of the visit, the creation of new audiences and new forms of communication, the changing of attitudes, and social inclusion, to mention only a few.

Increasingly, there is the chance that some, usually young, users will get their first experience of cultural heritage through a virtual heritage application. Yet, we still know very little about what actually takes place during these encounters and the short- and long-term impact that they leave on users. Evaluation studies which combine a different set of methods and take place in the natural setting of cultural organisations can help us understand the complex and multifaceted phenomenon of ICT use in cultural sites.

7.2 An integrated methodology for evaluating ICT in cultural heritage settings

From an empirical point of view, the evaluation of ICT use in cultural heritage should focus on the way people behave at and around ICT applications, including the difficult to measure but important qualitative aspects, and not only on usability or cognitive results.

It is also important to try to identify as many as possible of the factors which affect the way visitors use ICT applications in cultural heritage settings and to express these through standard indicators. In order to understand the impact of technological exhibits in its multiple forms (knowledge acquisition, emotional

aspects, social interaction, etc.) we need elements of analysis which have to be necessarily external (using the researcher's point of view) or externalized (using the visitor's point of view).

It is usually more effective to use different evaluation methods (questionnaires, interviews, observation, focus groups, etc.), combining qualitative and quantitative approaches. The selection of the particular methodology should depend on the specific aims and context of the project. It is also usually more useful to carry out evaluation research in the natural environment of the cultural heritage or museum setting, rather than the artificial situation of a lab.

In previous publications we have referred to some recent evaluation studies of technological displays which have used observation in order to study different aspects of visitors' engagement and learning (Economou and Pujol 2006, Pujol and Economou 2006). We applied some of the lessons learned in these studies and also tested some of our ideas about studying social interaction when using ICT applications in cultural settings in three different case studies:

- The 'Immaginare Roma Antica' exhibition, Rome, autumn 2005
- Enam Museum, autumn 2006, and
- Hellenic Cosmos, Foundation of the Hellenic World, Athens, spring—summer 2007.

7.3 Evaluation of the 'Immaginare Roma Antica' exhibition

The first case study examined the exhibition organised at the Trajan Markets of Rome by the Istituto per le Tecnologie Applicate ai Beni Culturali (ITABC) from September 15 to November 20, 2005. The exhibition was titled 'Immaginare Roma Antica' and included a selection of the different ICT applications related to the ancient city of Rome, the Roman Empire or innovative research implementations submitted to an international call for technological applications (VR, multimedia, audiovisuals, etc.). The call was organised inside the Virtual Heritage Centre project promoted by the Rome City Council, the Imperial Roman Forum Museum, UNESCO, Region of Lazio Funding Group, the Italian National Research Centre, and LUISS University.

This exhibition, in which audiences were able to interact with different high-tech exhibits, offered the invaluable opportunity to undertake a survey aimed at assessing visitors' perception of the use of ICT in the cultural heritage field and the way different kinds of technological displays are used in the informal learning context. The project was presented in more detail, together with the preliminary results of the evaluation in Forte *et al.* (2006), while in Pujol and Economou (2006) we referred to the evaluation methodology and to visitors' reactions in relation to four different groups of variables: individual, social, technological interaction, and learning. In the same publication we also discussed the social use of the different exhibits which this exhibition provided, reaching the conclusion that the design of museum experiences has to take into consideration the social dimension. This is because it is so fundamental, that visitors will use any available resources to serve it optimally and this might be different from the way in which it had been originally designed.

'Immaginare Roma Antica' confirmed the findings from other studies showing that there can be no learning if users do not understand the operation of the interface first (vom Lehn, *et al.* 2005, Roussou 2004, Asensio *et al.* 1993, Scott *et al.* 2003, Alzúa-Sorzábal *et al.* 2005, Economou and Pujol, 2006, Jovet 2003, Xu *et al.* 2005). When visitors had mastered the interface or were shown its use by a member of staff, they seemed to really enjoy the exhibit and made comments or asked questions about the content. However, in some cases where a particularly novel technology was used, such as the tactile devices (see Figure 61), the technology appeared to overshadow the content. The evaluation compared also how the different ICT interfaces were related to learning indicators and the roles adopted by visitor groups depending on the personality, skills, and characteristics of each member. Furthermore, the study observed how different types of visitor (such as single visitors, couples, families, older visitors) interacted with the different exhibits.



Figure 61: PERCRO's tactile device for the “Museum of Pure Form” at the “Building Virtual Rome” Exhibition.

An interesting finding from the observation at the Rome exhibition was that, in general, people seemed to appreciate and prefer a human guide to show them the interface, and then they were able to concentrate on the content, or assist them in the case of problems with the navigation because it was easy for them to reproduce the actions they had already seen or been told about.

7.4 Evaluation at the Ename Museum

In order to explore further the issues surrounding the use of ICT in cultural heritage settings, we conducted another in-depth evaluation at the Ename Museum at the village of Ename, near Ghent in Belgium. The Ename museum was opened in September 1998 as an interpretation centre of the architectural monuments (the church of Saint Laurentius) and the archaeological site (Ename’s abbey). These were considered as remarkable witnesses of the village’s economic and political role in the past, and instrumental in shaping Ename’s historical identity. We selected this case study as it uses in the same space three different types of museographical solution, each offering a different kind of interaction, in order to interpret Ename’s history through the material culture which survived.

The first type of display was the exhibition gallery with the timeline of Ename’s past illustrated by a sequence of objects behind showcases and the use of a touch-screen virtual reality application showing a reconstruction of the abbey’s history. The reconstruction can be rotated in space if the user drags his/her finger horizontally and in time if the user drags his/her finger vertically. The digital images of the objects are located at a third level in the electronic application, after the user has activated the zoom function, and are shown by pressing on the screen icons of archaeological sticks which indicate the place of the findings on the virtual model.

The second gallery of the Museum is dedicated to the ‘Feast of a Thousand Years’ exhibit (see Figure 62). This includes a round interactive display case covered by a transparent ‘bubble’ containing twenty-four archaeological objects. These can be selected by pressing the buttons positioned around the case. Each one of these objects is linked with one of the twenty-four three-dimensional mannequin figures dressed in period costumes in the nearby diorama. The figures sitting at the same feast table represent historical or social characters from Ename’s history (spanning approximately one thousand years from the present). The personal stories of these characters are narrated by real actors dressed in period costumes and shown performing in short video recordings projected onto the big screen behind the table. The ‘Feast of a Thousand Years’ is like a trip back through time, which tries to bring the objects to life, show the personal stories hidden behind them, but always aims to link them to the historical context and emphasize by means of the museographical design that knowledge goes from the archaeological remains to the ‘uncertainty’ of the past.

Finally, the last gallery of the Museum includes the ‘Archaeolab’, a hands-on area aimed at showing the basic methods and techniques used to obtain the information presented in the museum. This area uses wall panels, an exhibit about archaeological stratigraphy, and, finally, a reproduction of an ideal archaeological lab, containing all the ‘auxiliary’ sciences assisting the research process.

In our evaluation study we tried to understand what visitors obtained from the exhibits and what the specific contribution of each of the technological applications was. We asked visitors what they thought about some characteristic features of the exhibits (such as interactivity, usability, engagement, etc.), their level of satisfaction, the real use of the resources, and exhibition elements. The methodology used was based mainly on observation, interviews, and self-administered questionnaires. Some of the first results are presented in another publications (Pujol and Economou, forthcoming), so we will only summarize here the key findings.



Figure 62: The ‘Feast of a Thousand Years’ at Ename’s Provincial Archaeological Museum.

The idea of interactivity mixes ideas from different disciplines and has ended up meaning different things to different people, as was shown by visitors' answers, which indicate how they experienced the different levels of interactivity evident in the Museum's displays. For example, the interactivity offered by the 'Timeline' was seen as useful for learning about the past, as the virtual reality application positioned next to the objects was perceived as providing more and more complete information about the subject and was experienced as allowing a flexible, personalized exploration. The 'Timeline' was also voted the most appropriate exhibit for learning as it allowed visitors to obtain a general, quick idea of the abbey's evolution in time, which was easy to grasp because it was transmitted by visual means. Observations confirmed the complementary relationship between the objects in the display cases and the 'Timeline'. It appeared that in general visitors preferred to learn about Enamel's historical evolution by following the object-based low-technology sequence (which is naturally indicated by means of the spatial configuration of the display cases and the information panels) until the end, and then complement it by using the virtual reality application.

The results from the evaluation of all the galleries showed that the visitors' view about the technological exhibits' potential for learning was always influenced (even if to different extents according to the visitors' profile) by usability and interface design.

The 'Feast of a Thousand Years' was one of the most successful aspects of the visit to the Museum, mainly due to its focus on people and their lives and its 'empathic' approach, which appealed to most respondents. It is interesting that although observation indicated that most visitors had problems understanding the linking of the different elements, the visitors themselves in the interviews rated this exhibit as the most easy to use and comfortable, as it allowed them to sit at the benches and simply watch the video segments.

Visitors appreciated the hands-on elements of the 'Archaeolab' that they could actually touch, "unlike what usually happens in most museums". However, observation showed that this remained the most underused gallery of the Museum, perhaps because it is at the end of the visit when 'museum fatigue' might have affected most visitors, or perhaps because they were not used to the idea of touching museum displays and the design and textual explanations of the 'Archaeolab' did not encourage this strongly enough to make them overcome their hesitation. In agreement with studies conducted in formal learning environments (Carretero *et al.* 1994, Reid *et al.* 2003), it appears that discovery learning needs a big investment of time, the support of complementary guides, and explanations in order to be really effective, and it is often only those who already have a knowledge of the subject that take real advantage of it.

7.5 Evaluation study at 'Hellenic Cosmos', Foundation of the Hellenic World

The Foundation of the Hellenic World is a privately funded non-profit cultural organisation founded in 1993 and located in Athens, Greece (see Figure 63). Its mission is the preservation of Greek history and culture and the creation of an awareness of its contribution to other cultures. Hellenic Cosmos is Foundation of the Hellenic World's Cultural Centre, which was inaugurated in 1998 and is housed at a large site of a former industrial building, specially converted to house the Foundation's exhibitions, interactive exhibits, educational programmes, and other activities.

'Kivotos', the cave-like system, is one of the first virtual reality environments of the Foundation of the Hellenic World. It uses special projection in a three by three by three metre room, where a small number of visitors (normally up to ten or twelve) view the application wearing special stereoscopic glasses, getting a feeling of immersion. The navigation is controlled by one person (in the case of the Foundation of the Hellenic World, usually a museum educator who acts as a guide), using a small navigation device. Most applications at the 'Kivotos' reconstruct aspects of ancient Greek life, such as the 'Journey to Ancient Miletus', 'A Walk in Ancient Olympia', and 'The Workshop of Phidias in Olympia'.



Figure 63: The Hellenic Cosmos of the Foundation of the Hellenic World in Athens.

The ‘Dome’ (‘Tholos’ in Greek) is the Foundation of the Hellenic World’s dome-shaped Virtual Reality Theatre, which was inaugurated in December 2006, attracting a lot of media attention. It has a capacity of 130 people and the shows that are displayed on its semi-circular projection surface give visitors a feeling of immersion. During its first year of operation the ‘Dome’ has been displaying the interactive application on the ancient Athenian Agora, which is a photorealistic three-dimensional reconstruction of its buildings and monuments. The Foundation’s museum educators guide visitors through the application (which renders the projected images in real time), offering them the chance to interact at selected parts, such as when they are asked to vote on whom to ostracise from ancient Athens by pushing one of the coloured buttons located on the arms of their seats.

The exhibition ‘Meeting at the Ancient Agora’, which opened in 2007, complements the ‘Dome’ and contextualizes the buildings shown there, as it tries to bring to life the social, political, and cultural reality of the city of Athens during the period when the buildings of the ancient Agora were created.

The co-existence of these different types of museographic as well as technological approaches provided an interesting environment for evaluation research. The evaluation study at the Foundation of the Hellenic World in Athens aims at providing new empirical data about:

- The perception and use of technological exhibits by audiences, depending on different levels of interactivity, immersion, and possibility of social participation, and
- Their preferences about learning through ICT at informal settings.

At the same time the research project is testing the proposal of a new evaluative methodology specifically designed for the analysis of technological exhibits in museums, which takes into account and ultimately integrates all the factors involved in this relationship, and which until now had been analysed separately: the interface features, the visitors’ characteristics, and the context (spatial configuration and social interactions).

In this general framework, there are two specific goals. The first one has to do with the sensation of presence. This concept's definition and causal factors have been debated largely in the last years but it has not been related to the cultural heritage field until very recently and its suitability and adaptation are now under discussion. The technological exhibits at the Hellenic Cosmos (mainly the cave-like system and the virtual reality 'Dome') are very appropriate to explore these issues as their goal is to make visitors learn about specific archaeological content through a guided trip in time. To that end, increasingly immersive systems are used, which show realistic reconstructions of monumental places (based on the results of archaeological research) through a human-driven navigation and explanation in real time. This allows us to focus our evaluation on the added value of presence in order to learn about the past. In this case, presence is understood as 'being there and then', mainly generated by technological factors (immersion, visual realism and restricted interactivity), onto which the guide's explanation is superimposed.



Figure 64: The exhibition 'Meeting at the ancient Agora' at the Hellenic Cosmos combines low- and high-technology exhibits.

On the other hand, the Agora exhibition proposes a combination of low- and high-technology interactivity (see Figure 64) for the exploration, personal interpretation, and social construction of meaning, which might provide also some sense of 'presence' or at least intellectual and emotional involvement. This allows us to compare the different interfaces and communication solutions (exhibition/technology) in order to understand their specific contribution according to visitors' opinion:

- Did visitors have the sensation of 'being there'? What made them feel like that?
- What is its benefit from cultural heritage's point of view?
- What is the specific contribution of the technological (different interfaces and degree of visual realism) and social factors (interaction between visitors and with the museum educator)?

The second goal of this survey has to do with the suitability of high-technology exhibits for learning in cultural heritage institutions and investigating the best way to convey their message. The related literature shows that technological applications have positive results, especially in the formal learning environment, in relation to impact, iconic skills, and improvement of engagement (Economou and Pujol (2006) provide

an overview of published research findings on these topics). However, some negative aspects have also been evidenced, such as problems of integration with the rest of exhibits, obstruction of learning by non-intuitive interfaces, and limitation of social interaction because of their one-to-one communication paradigm. This is why we were interested in visitors' preference about communicational solutions for learning:

- What is in their opinion the usefulness of virtual reality in the cultural heritage field?
- How is it related to the exhibitions and to the other technological exhibits at the Foundation of the Hellenic World?
- When using virtual reality, which communication medium (images, text, and oral explanations) is better for learning and what is its specific contribution? Can virtual reality accomplish its mission without any verbal complement? What is the specific contribution of the guide?

These questions are also valid for the exhibition 'Meeting at the Ancient Agora', where high- and low-technology exhibits allow different kinds of exploration and degrees of collaborative interaction. Although initially our research plans were to take the exhibition in its totality, as a single communicational solution only for comparative purposes to the technological exhibits at the 'Kivotos' and the Dome, in the end, a specific evaluation with questionnaires and observations was designed for it because it allowed us to continue deepening in the social dimension of the use of these exhibits. In this case, we could:

- Compare the social interaction generated by different kinds of interface (low- and high-technology from more collaborative to more individual), and
- Compare the integration of the high-technology exhibit with the more hands-on exhibits in the same museographical units.

Therefore, we are investigating:

- How do visitors use these different museographical solutions?
- How much time is spent in each one?
- Which exhibits are considered the most suitable according to different criteria (easy of use, enjoyment, interaction, engagement, learning, and accommodation of group needs)?

Finally, as it is one of the main goals of cultural institutions – and especially of the Foundation of the Hellenic World, which receives visits from hundreds of school children and students every year – it was also interesting to record some results about learning. In order to understand what remains from so different experiences, we decided to ask about which specific content they remembered from their experience at the Hellenic Cosmos's different exhibits, either something they did not know before or something that impressed them. In this way we could detect some aspects of cognitive gain (recall), while at the same time covering personal differences in learning/communicational abilities and also overcoming the fact that virtual reality cannot be measured through traditional text-based tests (because it activates different mental skills).

The aim of this evaluation survey was to triangulate the information whenever possible in order to build a circular flow of hypotheses rising and verification, both for the virtual reality displays and for the Agora exhibition. The main methods used were: observations, questionnaire-based interviews with visitors, and interviews with the museum educators.

Although it is early to draw any conclusions from the data gathered until now, as we continue to analyse them, we can summarise below some of the most interesting comments made by visitors.

In general, visitors gave positive answers about their experience at the Hellenic World. They consider that the virtual reality exhibits were like a trip in time which allowed a better understanding of the archaeological sites, especially when they had previously visited them in reality. When comparing the ‘Dome’ with the ‘Kivotos’, preferences were shared: The ‘Dome’ was seen as more impressive and pioneering, and was compared to a film where they really felt the space; on the other hand, the ‘Kivotos’ was perceived as more interactive (especially when they saw particular applications) and it also allowed a closer human contact, which was much appreciated. From the Dome, they especially remembered the most interactive parts (where they were asked to vote in an ostracism and taking the ‘trip’ through the amphora, which is visually impressive); similarly, from the ‘Kivotos’, they also remembered the most active and participatory parts, such as throwing the javelin in the Olympic Games.

All comments about the exhibition of the Athenian Agora were positive. According to visitors’ opinion, it provided detailed content, which they could explore at their own pace, while the ‘Dome’ provided, in a pleasant way, general knowledge about ancient Athens (especially about the transformation in time). This is why some of the visitors mentioned that they would have preferred to visit the exhibition first and the Dome afterwards: they thought that the exhibition provided a good introduction, where they could explore the details at their own pace, and the ‘Dome’ provided an impressive conclusion to the visit, where they could learn more quickly and easily. This is the main reason that they considered it suitable for children.

The survey has shown so far that visitors like the possibility of participation in the virtual reality exhibits. Although they would not have liked to be given the control of the interface at the ‘Kivotos’ or the Dome, because they considered it was very nice and educational to have a person guiding the navigation and explaining the content (with the added possibility to ask things at specific moments), they would have appreciated the possibility to explore more buildings, and especially the Acropolis, which several of them mentioned.

The most common comment about the Dome was the lack of human presence inside the virtual world. They would have liked to see more people doing daily activities. Some people referred to the realism of the virtual world and made comments about the low quality of images, technical problems, or deformation of buildings. However, some other visitors expressed the opposite opinion (that it was very well designed) or that they had perceived some deformation of the image but did not consider it a major problem. It is probable that this answer is related with their previous experience with computers, their expectations about the visit, their age, and their attitude towards Greek heritage and the past in general.

Other general comments that several interviewees made referred to the important role of the Hellenic Cosmos and the Foundation of the Hellenic World for the dissemination of Greek Heritage.

7.6 Conclusions

We are still in the process of synthesising and comparing the results from these quite different case studies to reach some common conclusions. From these we hope to also be able to derive guidelines for the design of ICT exhibits which support effectively social interaction and their integration in cultural heritage settings.

In the meantime, all case studies have shown the potential of the different types of ICT application for supporting learning and exploration of new concepts and for triggering an interest in the subject, particularly for less knowledgeable users. However, our observations from the three different environments (see Figure 65) agreed with previous studies, that there cannot be any learning if users do not first understand well how the interface works (vom Lehn *et al.* 2005, Roussou 2004, Asensio *et al.* 1993, Scott *et al.* 2003, Alzúa-Sorzábal *et al.* 2005, Economou and Pujol 2006, Jovet 2003, Xu *et al.* 2005).

Furthermore, our research has shown that the integration of ICT exhibits in the socially and media rich environment of an exhibition is not always effective, as the interaction model of ICT is primarily individual

(Heath *et al.* 2005) and can often destroy the communication within visitor groups (Pujol 2005, Economou and Pujol 2006).

In the last couple of decades museological thinking has stressed that museum visiting is a social experience (McManus 1988, Falk and Dierking 2000, Hooper-Greenhill 1994, Falk and Dierking 1992), which was confirmed in our studies. Our research also agreed with the numerous evaluation and visitor studies which have shown that interacting with all the people who share the gallery space affects what we make of and take away from it (Galani 2003, vom Lehn *et al.* 2002 and 2005, Heath *et al.* 2005). It is interesting to observe that despite the experimentation with various interfaces, most ICT exhibits often still isolate the users in front of a screen, forcing groups to adapt their behaviour and relationship between their members (see Figure 66).



Figure 65: Use of the virtual reality applications at the Timeline gallery of the Ename Museum.

Further analyses of these findings, as well as more systematic evaluation research, will help us build a more complete picture of the multifaceted phenomenon of cultural heritage visits, and particularly how these are transformed when ICT applications are introduced. Work in this direction will also help to define appropriate methodological models which help record different aspects of the same phenomenon.

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Figure 66: Use of an ICT exhibit at the Building Virtual Rome exhibition: when designed for single users, the rest of the group become mere spectators or need to interact through the direct user.

References

- Alzúa-Sorzábal A., Linaza, M. T., Abad, M., Arretxea, L. and Susperregui, A. (2005) Interface evaluation for cultural heritage applications: The case of FERRUM exhibition. In *VAST 2005: 6th international symposium on virtual reality, archaeology and intelligent cultural heritage*, 122–128.
- Asensio, M., García Blanco, A. and Pol Méndez, E. (1993) Evaluación cognitiva de la exposición ‘Los Bronces Romanos en España’: Dimensiones ambientales, comunicativas y comprensivas. *Boletín de ANABAD* 43 (3–4), 215–255.
- Carretero, M., Jacott, L., Limón, M., Lopez-Manjón, A. and León, J. A. (1994) Historical knowledge: Cognitive and instructional implications, in Carretero, M. and Voss, J. F. (eds.) *Cognitive and Instructional Processes in History and the Social Sciences*. Lawrence Erlbaum Associates: Hillsdale, 357–76.

- Economou, M. and Pujol, L. (2006) Educational tool or expensive toy? Evaluating VR evaluation and its relevance for Virtual Heritage. In *New Heritage: Beyond versimilitude. Conference on Cultural Heritage and New Media. Proceedings of the New Heritage Conference, Hong-Kong*, 284–302.
- Falk, J. H. and Dierking, L. D. (1992) *The museum experience*. Whalesback Books: Washington.
- Falk, J. H. and Dierking, L. D. (2000) Learning from museums. Visitor experiences and the making of meaning. AltaMira Press: Lanham, MD.
- Forte, M., Pescarin, S. and Pujol, L. (2006) VR applications, new devices and museums: What about the audience's feedback and learning? In Ioannides, M., Arnold, D., Niccolucci, F. and Mania, K. (eds.) *VAST 2006: Proceedings of the 7th international symposium on virtual reality, archaeology and cultural heritage*, Projects and Short Papers volume.
- Galani, A. (2003) Mixed reality museum visits: Using new technologies to support co-visiting for local and remote visitors. In *Museological Review*, special issue 10, 1–17. http://www.equator.ac.uk/var/uploads/Galani_A.2003.pdf.
- Hooper-Greenhill, E. (1994) *Museums and their visitors*. Routledge: London.
- Heath, C., vom Lehn, D. and Osborne, J. (2005) Interaction and interactives: Collaboration and participation with computer-based exhibits. *Public Understanding of Science* 14, 91–101.
- Jovet, V. (2003) Le multimedia dans l'exposition: la double problématique de l'appropriation et de l'intégration d'un media marginal. *ICHIM03: Cultural Institutions and Digital Technology*. ICHIM: Toronto.
- McManus, P. M. (1988) Good companions ... more on the social determination of learning-related behaviour in a science museum. *International Journal of Museum Management and Curatorship* 7, 37–44.
- Pujol, L. (2005) Interactivity in virtual and multimedia environments: A meeting point for education and ICT in archaeological museums. In *VSMM 2005: Virtual reality at work in the 21st century- Impact on society*, 37–52.
- Pujol, L. and Economou, M. (2006) Evaluating the social context of ICT applications in museum exhibitions. In Ioannides, M., Arnold, D., Niccolucci, F. and Mania, K. (eds.) *VAST 2006: Proceedings of the 7th international symposium on virtual reality, archaeology and cultural heritage*, 219–228.
- Reid, D.J., Zhang, J. and Chen, Q. (2003) Supporting scientific discovery learning in a simulation environment, *Journal of Computer Assisted Learning* 19(1): 9–20.
- Roussou, M. (2004) Interactivity and conceptual learning in virtual environments for children, in *CHI 2004*. Doctoral Consortium, pp. 1049–1050. http://makebelieve.gr/mr/www/mr_publications.html.
- Scott, S. D., Mandryk, R. L. and Inkpen, K. M. (2003) Understanding children's collaborative interactions in shared environments. *Journal of Computer Assisted Learning* 19, 220–228.
- vom Lehn, D., Heath, C. and Hindmarsh, J. (2002) Video based field studies in museums and galleries. *Visitor Studies Today!* Fall/Winter, 15–23.
- vom Lehn, D., Heath, C. and Hindmarsh, J. (2005) Rethinking interactivity: Design for participation in museums and galleries. In *Re-thinking technology in museums: Towards a new understanding of people's experience in museums*. <http://www.idc.ul.ie/museumworkshop/programme.html>.

Xu, D., Mazzone, E. and Macfarlane, S. (2005) Informant design with children. Designing children's tangible technology. In *Re-thinking technology in museums: Towards a new understanding of people's experience in museums*. <http://www.idc.ul.ie/museumworkshop/programme.html>.

Glossary

Adaptive re-use

The recycling of an older building, or structure, often for a new function. This can involve extensive restoration or rehabilitation of both the interior and exterior.

Branding

A mechanism for creating a distinctive identity for a service or product, allowing it to be distinguished from competing products and services.

Capital equipment

These are goods that an institution does not consume during everyday use and which provide operating benefits over time (such as touch-screen displays, projectors, and audio-visual equipment, etc.). This type of equipment is considered an asset or capital asset of the institution.

Capital expenditure

Financial expenditure on capital assets rather than on operating expenses. These expenditures will contribute to the property and equipment of an institution thereby enhancing its value.

CBA

See Council for British Archaeology.

Conservation

All the processes devoted to the preservation of cultural heritage for the future. Conservation activities include examination, documentation, treatment, and preventative care, supported by research and education.

Cultural sector

The cultural sector comprises four elements: Heritage, arts, cultural industries, and libraries and archives.

Cultural industries

These include the film and video industry, broadcasting, sound and music recording, book and periodical publishing, theatre, and new media (including multi- and interactive media).

Consumer surplus

The net difference between the actual cost of a good or service to a consumer and the price that they would be willing to pay for that same good or service. This is the net benefit an individual receives from the consumption of a particular commodity. For non-market goods, the willingness to pay is equivalent to the consumer surplus.

Contingent choice

A stated preference methodology similar to contingent valuation. Like contingent valuation it requires individuals to make rank choices based on a hypothetical scenario. Unlike contingent valuation it does not directly ask respondents to state their values in financial terms. These values are inferred from the hypothetical choices (or tradeoffs) that people make.

Contingent valuation method

A stated preference technique in which a hypothetical market is constructed and individuals are questioned as to how much they would be willing to pay to conserve the non-market benefits or their willingness to accept compensation for the loss of those goods. This preference can then be used to infer the value that individuals place on the non-market benefits in the scenario; this can then be used to estimate the value of these goods to society.

COO

Cost Of Ownership. See *TCO*.

Cost–benefit analysis

An economic valuation method that tries to assess all of the major economic impacts associated with an investment decision, including non-market impacts. The techniques can be used to determine if a project represents a net social benefit to society.

Council for British Archaeology

The Council for British Archaeology (CBA) is an educational charity that promotes knowledge, appreciation and care of the historic environment in the UK. The CBA is a key independent voice promoting conservation of the historic environment, is the principal non-governmental organisation for involving young people in archaeology and promoting voluntary involvement in archaeology across the British Isles, and it is strongly involved in providing digital and other information services for archaeology (www.britarch.ac.uk).

Council of Europe

Founded in 1949, the Council of Europe was set up to defend human rights, parliamentary democracy, and the rule of law, in addition to standardising member countries' social and legal practices, and the promotion of a European identity based on shared values.

Cultural heritage

Things and places associated with the heritage of human activity. This includes everything from monuments, buildings, relics, towns, landscapes, and movable items.

Culture

The distinctive spiritual, material, intellectual and emotional features that characterise a society or social group. This includes everything from the arts to modes of life, value systems, traditions, and beliefs.

Cultural landscapes

These can include natural environments that have been exploited using a particular means of agricultural or pastoral activity. They can be aesthetically-pleasing areas such as gardens and parks, or apparently natural regions that have associated religious, artistic or cultural meanings.

CV

See *Contingent valuation method*.

CVM

See *Contingent valuation method*.

DCMS

See *Department of Culture Media and Sport*.

Department of Culture, Media and Sport

The Department of Culture, Media and Sport (DCMS) is responsible for the UK Government's policy on the arts, sport, the National Lottery, tourism, libraries, museums and galleries, broadcasting, creative industries including film and the music industry, press freedom and regulation, licensing, gambling, and the historic environment. The DCMS is also responsible for the listing of historic buildings and scheduling of ancient monuments, the export licensing of cultural goods, the management of the Government Art Collection, and for the Royal Parks Agency (www.culture.gov.uk).

Direct use

The actual on-site use and consumption of the resources of a cultural heritage site.

Disposable income

The income individuals retain after they have paid their tax. Individuals can spend this money however they wish.

DOCOMOMO

International Working Party for Documentation and Conservation of Building Sites and Neighbourhoods of the Modern Movement. Founded in 1988 DOCOMOMO is an international non-profit organisation dedicated to the conservation and recording of modern movement buildings (www.docomomo.com).

Economic impact

In the context of cultural heritage these are changes in a defined economy that result from spending attributed to a cultural heritage site or event.

Economic value

The maximum amount an individual is willing to pay in order to retain a good or service, or the minimum that an individual is willing to accept as compensation to sell a good or service.

Edutainment

A presentation that combines both education and entertainment. Interactive edutainment software for children is one of the leading uses of this genre. See *Infotainment*.

English Heritage

Officially known as the Historic Buildings and Monuments Commission for England. Founded in 1984, English Heritage is an executive non-departmental public body sponsored by the Department of Culture, Media and Sport (DCMS). English Heritage has responsibility for all aspects of the protection and promotion of the historic environment (www.english-heritage.org.uk).

FTE

Full Time Equivalent employees. Statistics for total employment often include part-time workers; these can be converted to FTEs in order to enable effective comparisons.

GDP

Gross Domestic Product. A measure of the total output produced in a given period. GDP is equivalent to total income and total expenditure.

Heritage Lottery Fund

The Heritage Lottery Fund (HLF) was set up by the UK's Parliament in 1994 to give grants to a wide range of projects involving the local, regional and national heritage of the United Kingdom. The HLF distributes a share of the money raised by the 'National Lottery' to good causes. It is a 'non-departmental public body' that reports to Parliament through the Department of Culture, Media and Sport. Since 1994, the HLF has awarded over £3 billion to more than 15,000 projects across the UK (www.hlf.org.uk).

Historic Royal Palaces

The Historic Royal Palaces charitable trust was established in the UK in April 1998 as a Royal Charter Body with charitable status in order to manage the unoccupied royal palaces. There are five principal sites: The Tower of London, Hampton Court Palace, Kensington Palace, the Banqueting House, Whitehall, and Kew Palace. The Historic Royal Palaces are an independent charity which is not funded by the Government or the Crown (www.hrp.org.uk).

HLF

See *Heritage Lottery Fund*.

IAIA

International Association for Impact Assessment. Founded in 1980 with the aim of bringing together practitioners, researchers, and users of various types of impact assessment worldwide (www.iaia.org).

ICA

International Council on Archives. Founded in Paris in 1948 the mission of the ICA is to promote the preservation and use of archives around the world. The ICA works for “the protection and enhancement of the memory of the world and to improve communication while respecting cultural diversity” (www.ica.org).

ICBS

International Committee of the Blue Shield. A joint initiative of the ICA, ICOM, ICOMOS, and the IFLA. Started in 1996 to provide authorities with expertise in the event of conflict affecting cultural heritage sites (www.ifla.org/blueshield.htm).

ICCROM

The International Centre for the Study of the Preservation and Restoration of Cultural Property. ICCROM is an intergovernmental organisation established in Rome in 1959 to improve the quality of conservation practice as well as raising awareness of the importance of preserving cultural heritage. The ICCROM acronym refers to the International Centre for Conservation in ROMe (www.iccrom.org).

ICOM

International Council On Museums. Created in 1946, ICOM is an international organisation of museums and museum professionals which is committed to the conservation and communication to society of the world’s natural and cultural heritage. It is a non-governmental organisation maintaining formal relations with UNESCO and having a consultative status with the United Nations’ Economic and Social Council (www.icom.museum).

ICOMOS

International Council On Monuments and Sites. Founded in 1965, ICOMOS is an international, non-governmental organisation dedicated to the conservation of the world’s historic monuments and sites. ICOMOS is UNESCO’s principal advisor in matters concerning the conservation and protection of monuments and sites (www.icomos.org).

IFLA

International Federation of Library Associations and Institutions. Founded in 1927, in Edinburgh, Scotland, the IFLA is the principal international body representing the interests of library and information services and their users (www.ifla.org).

IMLS

Institute of Museum and Library Services. Created in 1996 by the ‘Museum and Library Services Act’, the IMLS is an independent US federal agency that fosters leadership, innovation, and lifelong learning through support of the nation’s museums and libraries (www.imls.gov).

Indirect valuation methods

Methodologies that are based on the observation of behaviour in order to determine the willingness to pay for non-market goods or services.

Infotainment

The combination of information and entertainment in a single production. See *Edutainment*.

Intangible heritage

The traditional forms of expression of many societies. These can include: Languages, music and song, rites and beliefs, the performing arts, oral traditions, festive events, and even culinary traditions. Many of these are threatened by a trend towards cultural uniformity in contemporary society.

Intellectual property

A legal term for certain types of information, ideas, or other intangibles in their expressed form. Such unique works of the mind or the intellect can include everything from photographs to software design, etc. IP rights can be protected under the law in the same way as other property types using legal protection such as copyright, patents, and trademarks.

Interactive television

A form of television that allows users some form of limited interaction or content control.

IP

See *Intellectual property*.

Market

A context where goods and services are purchased and sold.

MCN

Museum Computer Network. Based in the US, the MCN is a non-profit organisation of professionals devoted to supporting the cultural aims of museums through the use of computer technologies (www.mcn.edu).

MLA

The Museums, Libraries and Archives Council. The MLA was launched in April 2000 and is the UK's strategic body representing museums, archives, and libraries. The new institution replaces the Museums and Galleries Commission and the Library and Information Commission (www.mla.gov.uk).

Moveable cultural heritage

A vast range of non-fixed cultural heritage items such as paintings, sculptures, ancient jewellery, grave-goods, sacred art, sculpted stone, and all kinds of works of ancient art.

Multiplier

The knock-on effects of an expenditure injection into an economy.

Museum

An institution that is open to the public which acquires, conserves, communicates, researches, and exhibits, for purposes of study, education, and enjoyment, material evidence of people and their environment. Museum collections now constitute a significant part of the cultural heritage.

National Archives

The National Archives of the United Kingdom was formed in April 2003 with the amalgamation of the Public Record Office and the Historical Manuscripts Commission. Its primary responsibilities are the records of central government and the courts of law (www.nationalarchives.gov.uk).

National Trust

Founded in the UK by three Victorian philanthropists in 1895 to protect places of historic interest and natural beauty for the nation. The National Trust is now the largest conservation charity in Europe (www.nationaltrust.org.uk).

NEMO

Network of European Museum Organisations. This is an independent network representing the European museum community. NEMO provides information to museums on relevant European Union initiatives, key legislative policy and funding concerning cultural heritage (www.nemo.org).

NOAA

National Oceanic and Atmospheric Administration. A US federal agency under the Department of Commerce responsible for weather monitoring and warnings (www.noaa.gov).

Non-exclusive

These are goods where a user cannot be stopped from ‘consuming’ that good. Public goods fall into the category of being both non-exclusive and non-rival.

Non-market goods

Goods which have no market and no market price. Sometimes called non-monetary goods.

Non-market values

Benefits obtained by individuals without paying money to acquire them. These are often personal values that are not captured in traditional economic markets. Their value is usually estimated through survey techniques such as contingent valuation and choice.

Non-rival

Goods where the quality of consumption by one user is not reduced by other users enjoying it simultaneously. Public goods fall into the category of being both non-rival and non-exclusive.

Opportunity cost

The theoretical sacrifice that is made when resources are allocated to one specific project and so cannot be used for other projects.

Profit

The net earnings or income of a company or institution.

Public goods

These are goods that are non-excludable and non-rival. They are available to all, without excluding anyone, and a number of people can enjoy the good simultaneously without interfering with each other’s satisfaction.

Restoration

This is the process by which the fabric of a structure is returned to a specified earlier state, by reassembling the material from that site. This differs from reconstruction in that no new material is used.

Reconstruction

The use of digital technology to reproduce the exact form and details of all or part of existing or vanished structures as they were at a specific period in time. Alternatively, in the physical world, this is the process by which the fabric of a structure is returned to a specified earlier state, by reassembling the material from that site and incorporating new material.

Recreation

This is the creation of a structure or building using surviving evidence to extrapolate the nature of a presumed earlier state using new material.

ROCE

Return on capital employed. See *ROI*.

Return On Investment

The profit (or return) that an institution gets from spending capital. ROI is widely used to evaluate IT investments and provides an approximation on the return of a project without the use of more sophisticated economic analyses.

ROI

See *Return on investment*.

Socio-economics

Socio-economic research analyses economic phenomena by studying variables both inside and outside the economy. It is based on the premise that politics, culture, and history provide a context in which contemporary economics function.

SPAB

The Society for the Protection of Ancient Buildings. Founded by William Morris in 1877 to address the destructive ‘restoration’ of medieval buildings in the UK. Today it is the oldest national pressure group fighting to save old buildings from decay, demolition, and damage (www.spab.org.uk).

Stakeholder analysis

The process through which the groups and individuals (stakeholders) who may be affected by a change are identified, and their gains and losses are quantified.

SWOT analysis

This is an analysis of the internal and external environment of an organisation for strategic planning purposes. Internal factors are classified as strengths (S) and weaknesses (W), while factors external to the organisation are classified as opportunities (O) and threats (T). The SWOT matrix created can be used as the basis for strategy formulation.

TCO

See *Total Cost of Ownership*.

TEV

See *Total Economic Value*.

TICCIH

The International Committee for the Conservation of the Industrial Heritage. An organisation dedicated to the promotion, preservation, conservation, investigation, documentation, research, and interpretation of the world’s industrial heritage (www.mnactec.com/TICCIH).

Total Cost of Ownership

This is the sum of all the costs associated with an item over its lifecycle. These costs include acquisition, installation, licensing, running costs, maintenance, and sometimes even disposal. TCO is widely used in the business world for expensive capital items. TCO is sometimes referred to as Cost Of Ownership (COO).

Total Economic Value

The total of direct and indirect use values, option values, and existence values.

Urban heritage

The heritage of urban areas and its accumulation over time, including the history of its buildings, streets, districts, and residents.

UNEP

United Nations Environment Programme. A UN programme designed to provide leadership and encourage partnership in caring for the environment by supporting nations and peoples to improve their quality of life without compromising that of future generations (www.unep.org).

UNESCO

United Nations Educational, Scientific and Cultural Organisation. Created in 1946 as an agency of the United Nations, whose remit was to promote world peace through its work in the areas of culture and communication, education, natural sciences, and social and human sciences (www.unesco.org).

Use value

The value placed on a site and resources by users of the site. Use value includes direct use, indirect use, and option values.

WHIN

World Heritage Information Network. An information network about the natural and cultural heritage sites on the World Heritage List (www.wcmc.org.uk/whin).

World Heritage Convention

Officially known as the ‘Convention concerning the Protection of the World Cultural and Natural Heritage’, although more commonly known as the World Heritage Convention. It was first proposed by the United States in 1972 and adopted by UNESCO in 1975 in order to protect the world’s natural and cultural heritage.

World Heritage Fund

The World Heritage Fund was established by UNESCO to provide international assistance to protect the world’s heritage. It is sustained by fees derived from member states, and voluntary contributions from countries, private organisations, and individuals.

World heritage list

The UNESCO list of World Heritage sites. Cultural and natural heritage sites of outstanding universal significance defined according to the World Heritage Convention.

World heritage site

A site designated by UNESCO as being of outstanding universal value from the point of view of history, art, or science.

WTO

World Tourism Organisation. The WTO was founded in 1974 out of the International Union of Official Travel Organisations (IUOTO). In 1976, WTO became an executing agency of the United Nations Development Programme (UNDP) and in 1977 a formal cooperation agreement was signed with the United Nations itself. The WTO is now a specialised agency of the United Nations (www.world-tourism.org).

WTTC

World Travel and Tourism Council. Represents the private sector in all parts of the world travel and tourism industry. The mission of the WTTC is to raise awareness of the full economic impact of travel and tourism (www.wttc.org).

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EPOCH

EPOCH (Excellence in Processing Open Cultural Heritage) is a Network of Excellence supported under the European Commission's Framework 6 (IST-2002-507382). The network joins academic, research, and cultural institutions to improve the quality and effectiveness of the use of IT for Cultural Heritage. EPOCH brings together expertise on monuments sites and museums and seeks to enhance the economic impact of these potential tourist venues. An explicit part of EPOCH is to identify the economic impact of the sites on their regions and report on good practice in technological investment to enhance that impact. The objective is to address issues such as sustainability, return on investment, effective deployment of technology, and multipurpose data capture.



CUBIST

The EPOCH Network of Excellence has a remit to research cultural heritage sites. Within this network considerable effort is devoted to the study of the socio-economic impact of cultural heritage sites across Europe. However, many of the issues associated with heritage apply equally to the broader cultural sector. In order to allow the greatest dissemination of research EPOCH and the University of Brighton Business School have created CUBIST Research (Cultural Business: Impact Strategy and Technology management).

CUBIST Research is a broad network of practitioners, researchers and consultants with members from across Europe. CUBIST Research adopts a holistic approach to addressing management problems in the Cultural and Heritage sector. The group offers specialist research and consultancy on the following areas:

- Strategic planning
- Marketing and revenue raising
- Socio-economic impact studies
- Technology strategy, project management, and impact evaluation
- Building partnerships to deliver technology solutions from strategic vision to completion.

CUBIST Research and the EPOCH socio-economic impact research group conduct socio-economic impact assessments on cultural heritage sites across Europe. For more information on the CUBIST Research Group visit <http://www.cubistresearch.org>

