Developing Performance Measures as part of an integrated approach to Conservation Management of Cultural Heritage Assets.

Jeremy Hutchings
Oslo University
Conservation Studies
j.d.hutchings@iakh.uio.no

ABSTRACT

For sustainable care of cultural heritage it is essential to set accurate goals. However, the difficulty involved in establishing what is "accurate" in any given circumstance is often highly underestimated. Unbalanced decision making based on partial consideration of the situation surrounding a cultural heritage asset can at best result in inefficient use of resources and at worst will lead to its rapid loss. But the balance of risk against benefit is not straightforward, the impact of certain activities are far easier to quantify than others. Consequently, the adoption of a well balanced approach that considers all activities equally within the same framework is the key to providing appropriate and sustainable levels of protection. The development of an appropriate and systematic methodology offers a resolution to this problem. The outcome will be a suite of performance indicators assigned to each activity within a multivariate management framework. This paper describes the development and validation of such a methodology and the current status of the author's research.

Keywords

Cultural Heritage, Conservation management, Soft system framework, Delphi survey.

INTRODUCTION

The conservation of cultural heritage can be defined as: "Any activity that will maintain a heritage asset on a permanent basis" (ICOMOS, 1964). More recently, this has expanded to: "all actions aimed at the safeguard of cultural property for the future" (CAC &CAPC, 2000). This includes many activities that impact on or play a role in the retention of loss of a cultural object. The management of cultural heritage assets is extremely complex as it must take into consideration a large number of different factors. Often managers are confronted by a over-whelming number of interconnected components that ideally should be taken into consideration. These include a diverse range of cultural materials, uses and roles, and an equally diverse range of threats. These stem from a large number of physical, economic and social factors and wide variety of demands made by large and small stakeholders. One of the greatest threats to cultural heritage is deliberate or accidental damage resulting from human actions. There are a number of reasons for this; often there is a lack of understanding or recognition of the complexity of circumstances influencing the condition of the object or the impact of societal activities carried out in its proximity. Actions intended to produce short term gain, such as increased revenue, which do not consider the long term ramifications for the object may be cited as a common example. In developed countries with large populations, human interaction with cultural heritage cannot be avoided, nor is restriction desirable as the preservation of heritage is undertaken for the benefit of both present and future generations. However, with increased human interaction the likelihood of damage is unavoidably amplified, either from direct use or as an indirect by-product of other activities, such as release of pollution from automobiles. Often it is not just individual cultural objects that are damaged but also their context, including associated material, which is devalued.

The high level of complexity encountered when assessing a situation causes extreme difficulty for the conservation manager, especially when he or she attempts to consider the full consequences of present actions in the distant future. A familiar example is the decision to improve public access to a historic venue without sufficient

consideration given to the impact of increased visitor numbers, which can result in unforeseen damage to both the site and its surrounding area. There is currently no appropriate or systematic methodology to accurately assess the full impact of individual activities and therefore the quality of conservation management decisions.

In the past, the use of performance measures in the cultural heritage sector has been limited and the outcome of conservation management actions has been expressed in narrow terms; specifically, those of the material aspects of either the heritage asset or of its environment. Conversely the viability of museums and historic sites has been typically measured using simple numerical indicators such as visitor numbers, income generated or size of asset. Given the current level of knowledge it is impossible to determine a course of action within a particular situation that is most likely to establish a sustainable balance between conflicting demands. Consequently the optimal point, where both social benefit through use and preservation is satisfied, cannot be determined. Therefore, the goal of my research is to develop a methodology through which a balance of these factors can be effectively achieved.

This paper presents the approach to the development of a comprehensive set of performance measures. This includes the construction of a framework describing conservation management from which statements expressing the outcomes of the associated activities are derived. The applicability of each statement to the goal of conservation and the comprehensiveness of the statement suite are confirmed through a questionnaire. This measures the ease with which each statement can be achieved and the contribution that it makes. The questionnaire also allows contributors to add statements. To develop broadly acceptable performance indicators the Delphi technique will be applied. This will be used to explore the benefits and drawbacks of each statement, identify potential indicators and assess their suitability. This is currently underway. The ultimate goal is the identification and evaluation of a cascading list of performance indicators linked to conservation management activities which can be applied to broad range of cultural heritage assets.

THE APPLICATION OF THE DELPHI FUTURES TECHNIQUE

To fully incorporate the variety of material cultural heritage and the scope of different opinions on use, preservation and adaptation expressed by various stakeholders, it is necessary to include a broad range of views from large number of individuals. This means that extant problem solving techniques and methods are inadequate due to their limited range of applicability. Therefore, it is necessary to find an alternative methodology through which a collective judgement from a broad variety of stakeholders can be obtained and which addresses the full range of possible cultural heritage scenarios, including potential conservation solutions. Alternative possible solutions, such as a debate forum with facilitator-led meetings, were rejected due to the logistic difficulty and cost. Such a group, if truly representative, would be larger than can be accommodated in a single discussion and much larger than the number that can interact effectively in a face-to-face exchange. Even if a series of meetings were held and kept to a manageable size, other problems would impede progress towards a balanced outcome. The principle difficulty is group heterogeneity which can inhibit individuals from expressing their views in front of others. Group meetings can in some circumstances be counterproductive as there are a number of subjects which are generally "taboo" in terms of cultural heritage and therefore difficult to discuss without confrontation. For example the acceptance of damage that occurs through use, the disposal of cultural heritage and the repatriation of antiquities. Difficulties are not limited to the interaction between different groups; often within homogeneous meetings some participants will express their opinion more forcefully than others, potentially stifling debate (Linstone and Turoff, 1975). Within well-defined professional and cultural entities such as conservators, curators and indigenous populations, individuals are often unwilling to openly express views that are perceived to be outside the boundaries of their own group, knowing them to be unacceptable to their peers. Ultimately, such constraints prevent a consensus of opinion being reached across all groups that represents a logical, balanced consideration of all issues.

The Delphi technique provides a mechanism through which a consensus can be reached as objectively as possible whilst avoiding the problems discussed earlier. It does this by providing a conduit through which a selective judgement can be made on a broadly collective basis without having to meet face-to-face. The principle benefit of this method is its ability to establish consensus or identify lack of consensus where accurate information does not exist or is unfeasible to obtain. This technique provides an effective and practicable means of reaching an informed consensus on the contribution made by different conservation activities. It also provides a method through which suitable performance indicators can be identified and examined. A further reason for the selection of this technique is that it enables opinion on conservation management activities to be gathered from a broader population of heritage

professionals. This includes representatives that are outside the professional constraints often encountered in museums and other cultural heritage organisations.

The Delphi technique has been described as "a method for structuring a group communication process so that [it] is effective in allowing a group of individuals, as a whole, to deal with complex problems" (Linstone and Turoff, 1975). The process is a series of rounds in which information is collected, analysed and disseminated as the basis for subsequent rounds. The key requirements for the Delphi technique are a structured flow of information, regular feedback and anonymity, all of which can be easily achieved through a regularly up-dated web-based questionnaire and discussion page. This provides an opportunity for participants to revise their opinions whilst retaining a degree of anonymity. In order to avoid an excessive number of rounds the first questionnaire is based on the framework described below.

DEVELOPMENT OF THE SOFT-SYSTEM CONSERVATION MANAGEMENT FRAMEWORK

A suitable framework should be capable of describing all relevant activities that must be considered in order to achieve high quality outcomes from management decisions. A number of different systematic approaches to the identification and development of performance indicators were investigated before selection of the "soft system" methodology. These included established methods for measuring sustainable practice in other sectors such as the design and construction industry (CIC 2002) and the natural environment (Hardi & Zdan. 1997, Hart 1998). As is typical of the manner in which it is necessary to adapt extant technology to the field of conservation, these methods would have needed to be substantially adjusted to suit the particular needs of conservation management. In their pre-existing forms, none were capable of fully describing the inter-relationship between different external factors influencing the change in condition of cultural heritage and conservation management activities that impact on its long-term preservation.

The "soft system" methodology, developed by Checkland, is intended to be used to construct models of complex "messy" situations that do not have single optimal outcomes (Checkland, 1981). These situations typically include human interactions where individuals or groups work together to achieve a common goal, and where undertaking a set of purposeful activities offer the most appropriate manner in which to achieve that goal. Conservation management fits this description, as it encompasses a high level of human influence both in terms of activity and outcome. It also involves complex interactions with contradictory goals, the impact of which often results in conflicting demands.

Where a hard systems approach seeks to engineer a rigid structure of activities capable of optimising a given outcome - typically, increased productivity or reduced cost, the soft system approach uses systemicity to construct a framework capable of interrogation so that it can then be compared to real situations. The application of the soft system methodology in this research differs from Checkland's early description in that it does not include the problem definition stage. This stage is not necessary because the framework is used to construct a logical argument not solve an organisational problem (Checkland, 1981). It is, however, consistent with later developments in soft system methodology which move away from a prescriptive number of stages in favour of an equally systematic but more flexible approach (Checkland, 1999:A32). Organisational models associated with institutions or professional boundaries are avoided as their validity will inevitably be limited. Instead the framework is based on sustainable management practices achieved through minimising risk, maximising significance and justifying actions in terms of delivery of benefits in a cost effective manner. A key consideration in its construction is the adoption of a viewpoint that is supportive of the collective goal. This is described by Checkland as the *Weltanschauung*, which can be loosely translated as world view or perspective (Checkland, 1981.215). In this case it can be expressed in simple terms as:

The preservation of cultural heritage for the benefit of present and future generations is a worth-while goal.

The approach herein uses "backward modelling" in which the conceptual framework is constructed before a concise description of the activity system is derived. This better suits the research goals stated in the introduction. The concise description of the activity system, shown in the box below, is still necessary as it makes explicit the standpoint from which the framework has been constructed. This allowed a comparison to be made with commonly accepted opinion.

An organised set of activities carried out by appropriately qualified persons within a publicly owned institution, through which historic material is collected, maintained, interpreted, exhibited and used to inform, educate, entertain and keep alive local communities from which the material originated, or within which the material has been collected, and visitors from further a field about their common past, for present and future.

An additional level of confidence in the framework is gained as the description of the activity system correlates well with both the accepted definition of a museum (ICOM Statutes art.2 para1. 2001) and the goals of conservation, such as those given in the introduction.

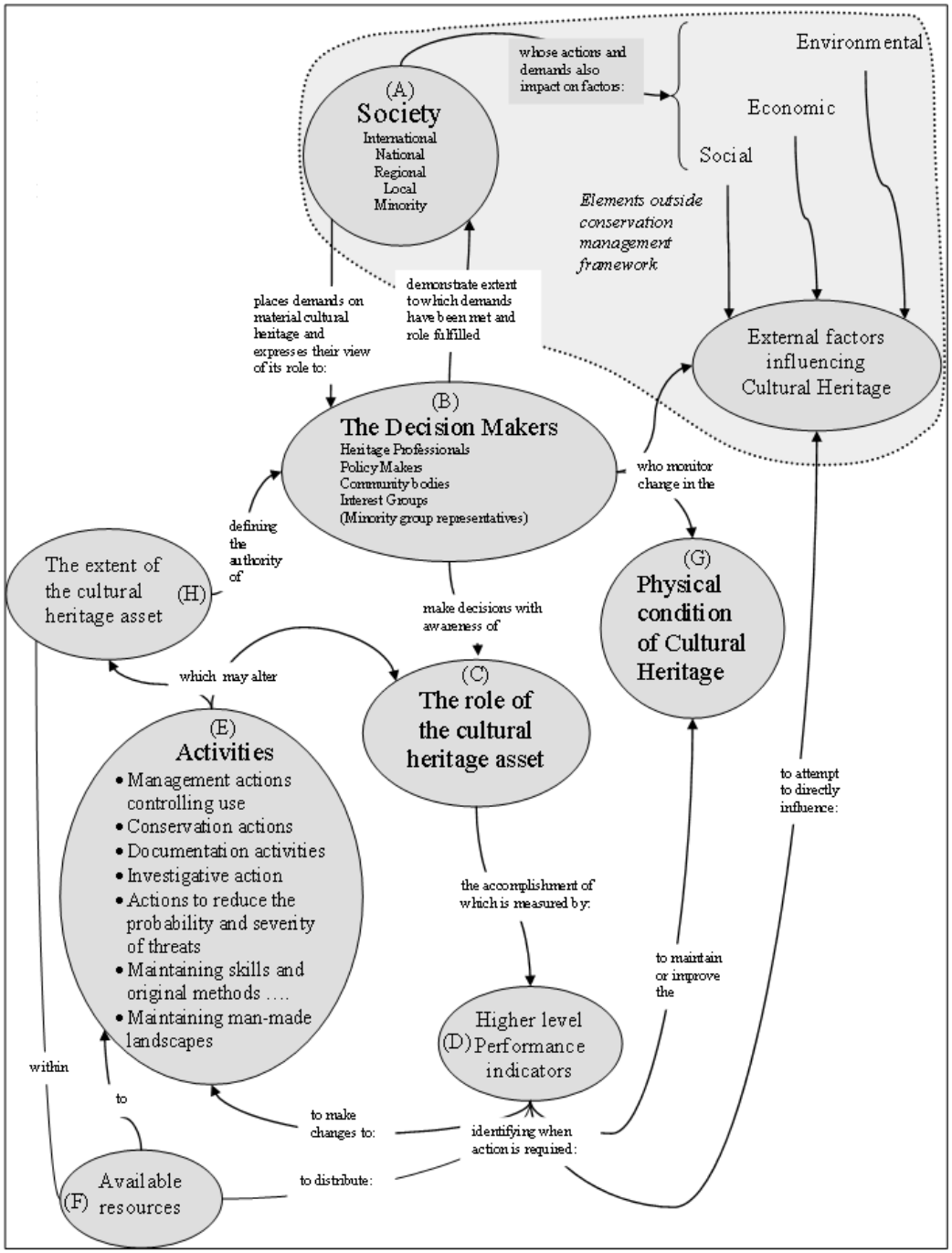

Figure 1. Highest level framework for the conservation management of material cultural heritage

The resulting highest level framework for conservation management, illustrated in figure 1, is constructed using logical arguments to describe the interaction between different management factors and activities. Individuals or groups within society are given or take responsibility for managing cultural heritage in order to fulfil the role defined for it by society. These individuals or groups are described as the decision makers (B) as they may not have a formal management title. Seven groups of activities (E) have been identified as representing conservation management at this level, shown at the left of the diagram. These are carried out within the confines of available resources (F) and within the defined extent of the asset (H), on the extreme left. The main purpose of sustaining the existence of cultural heritage in its present condition is to serve the community. This is represented as the two opposing arrows that show the direction in which imposed demands are made and confirmation that these demands have been met is given. The area in grey at the top right indicates a higher level system that includes society. This system can be measured in terms of environmental, social and economic impact, and is included in this framework to illustrate the three common classes of performance indicators at this level. The decision makers will both monitor and attempt to directly influence external factors but will not be able to control them. Feedback paths from the activities (E) and extent (H) alter or define the authority and role of the decision makers. Physical condition (G) is represented as a separate function in order reinforce its importance and to unequivocally establish that its measurement is separated from measurement of the activities. This separation reinforces this aspect of the framework as a fundamental aim of the conservation activities.

1. Management actions controlling use a. Promoting significance of asset b. Providing access c. Maintaining conditions for preservation d. Minimising impact on other cultural/natural resources
2. Conservation actions a. Specifying conditions for preservation b. Carrying out remedial conservation
3. Documentation activities a. Identify information b. Record information c. Maintain information d. Retrieve information
4. Investigative action a. Uncover the asset's true nature b. Identify how it has changed c. Identify future potential use
5. Actions to reduce the probability and severity of threats a. Avoiding the causes of damage b. Reducing the probability c. Blocking the effect d. Reducing the impact
6. Maintaining skills and original methods of production maintenance and repair a. Participation in training programmes b. Using traditional techniques c. Identifying and maintaining material sources
7. Maintaining man-made landscapes a. Management b. Re-establishment c. Developing and introducing new elements

Table 1. Activity descriptions for conservation management

The seven categories of activities have been derived through an iterative process of sorting into distinct groups different real life purposeful actions that contribute to the conservation of cultural heritage. The process undertaken can be described as a hermeneutic circle, as it moves through a systematic investigation from general activities to specific activities, frequently relating new information to what is already known. This process follows a circular pattern moving from one contributing activity to another until a satisfactory result is obtained (Honeycutt, 2005)

At the highest level, the categories of activities are distinct yet obviously interconnected. The overlap between each represents a shared functionality that contributes to the same goals. Each activity can be considered as a soft system framework in its own right. By following the same procedure similar frameworks have been constructed at a lower level for each. Table 1 lists the 23 activities that have been defined at this level of resolution. For example *Actions contributing to the reduction of probability and severity of threats* is shown as one of the seven highest level activities. This can be resolved into four sub-level activities: *avoiding the causes of damage, reducing the probability of such damage, blocking its effects and reducing their impact*. Although further resolution of these lower level activities can be achieved by constructing a framework for each, the resulting complexity and degree of inter-relationship creates confusion. The process was therefore halted at this stage.

PRE-DELPHI TESTING OF THE FRAMEWORK

Progression from the framework to the Delphi survey requires an intermediate stage that tests the appropriateness of each component, develops and revises proposed statements and identifies potential collaborators for the next stage.

This was achieved through the use of a pre-screening questionnaire which asked respondents to rank statements describing positive outcomes associated with conservation activities in terms of desirability and feasibility (see table 1),. Each statement was developed in consultation with representatives from relevant expert groups, such as conservators, archaeologists, cultural sector managers and heritage architects, thereby assuring the its content and validity The consultation process also ensured that each statement adequately described its intended outcome and that the questionnaire as a whole constituted a valid representative test of the activities being measured. Complex language was avoided and definite statements were used to ensure that it was as inclusive as possible. Similar statements that reflected outcomes from different activities were combined to avoid confusion. The resulting questionnaire contained the 39 statements given in appendix 1. During the developmental stage the terms desirability and feasibility were substituted for importance and difficulty, described in appendix 2. These terms were found to be more easily understood by participants who do not have English as their first language.

The four levels of importance and the option of “no opinion” used to assess each statement are based on the categories of judgment given by Turoff (Lindsone and Turoff, 1975). This offers a sliding scale that measures activities in terms of its effect on long term preservation. The “no opinion” option is included for respondents who do not wish to make a judgment. The difficulty with which the desired result can be achieved was evaluated using a similar scale. The two parameters; *importance* and *difficulty* have been combined into a single measure of meaningfulness, given in table 2. This compound term has been selected to describe a statement’s functionality, purpose and significance. Where achieving the outcome described by the statement is judged to be “very important” or “important” and is “easily” or “possibly” achievable, it may be classed as “very meaningful” or “meaningful”. This extends to outcomes that are easy to achieve but have little importance as the level of effort required for the minimal gains obtained is small enough for the activity to be warranted. Conversely where an outcome is “very important” but “probably unachievable”, considerable effort and resources may be justified in the implementation of activities that may not achieve the desired result. A diagonal intermediate zone exists where activities that result in an outcome may be “meaningful” in conjunction with a larger group of activities and therefore should be considered carefully. Activities that results in outcomes that are both unimportant and unachievable may be regarded as meaningless. These can be discarded at this stage as they do not significantly contribute to the goals of conservation and are unlikely to have a positive outcome.

Importance / Difficulty	Very important (1)	Important (2)	Little importance (3)	Unimportant (4)
Easily achievable (1)	**Very meaningful**	**Very meaningful**	**Meaningful**	**Insignificant meaning**
Possibly achievable (2)	**Very meaningful**	**Meaningful**	**Little meaning unless considered in conjunction with other activities**	**Meaningless**
Probably unachievable (3)	**Meaningful**	**Little meaning unless considered in conjunction with other activities**	**Insignificant meaning**	**Meaningless**
Unachievable (4)	**Little meaning unless considered in conjunction with other activities**	**Insignificant meaning**	**Meaningless**	**Meaningless**

Table 2. Meaningfulness of activities

DISTRIBUTION

Selection of the geographical region in which to carry out this research has been based on careful consideration of the potential problems that can be encountered. UNESCO divides the globe into five regions: Africa; Arab States; Asia and the Pacific; Europe and North America; and Latin America and the Caribbean. Each region exhibits substantial variation in its approach to the conservation of cultural heritage. This is due to differences in regional cultural identity, the perceived significance and value of cultural heritage, the level of development in the regions or country's cultural heritage sector, and other operational aspects such as the maintenance of traditions of conservation practice. These differences are demonstrated by geographical distribution of sites included on the World Heritage List (http://whc.unesco.org/en/list/). The vast majority of listed sites are located in the developed regions of the world, mainly Europe.

Given these considerations the decision was taken to limit the questionnaire to UK and Norway. These countries represent two typical Northern European approaches to conservation management. The UK has a well developed, long standing, and broad cultural heritage sector represented by a large number of heritage professionals and a well established network of professional organisations, such as the Institute of Conservation (ICON), Museums Association (MA), UK Registrars Group (UKRG), and Museums Documentation Association (MDA), whilst the milieu in Norway, although containing equally well trained professionals, is significantly smaller and younger.

A major difficulty in conducting this type of research is the resources required to contact such a large and diverse group of stakeholders within the two countries. There is no feasible, single mechanism through which this can be achieved. This difficulty has been overcome by limiting stakeholder groups to heritage professionals and distributing the questionnaire through e-mail lists held by various professional bodies, such as ICON and MDA in the UK and Det Nordisk Konservatorforbundet (NKF-N) in Norway. A number of international portals were also used, including heritage link and the conservation distribution list.

PRE-SCREENING RESPONSE

The circulation was estimated to be in excess of 1000 individuals. 65 responses were received by the deadline representing an estimated 6.5% return rate, most of whom indicated their willingness to participate in the Delphi stage. Because of the nature of the questionnaire and the use of unsolicited mailing this was considered as an acceptable level of return.

Reliability of the questionnaire was established using a test-retest protocol. This is an index of consistency over a short period of time, typically several weeks. Its principle function is to provide information on how much an individual's normative response is likely to change on near-term retesting. 10% of the respondents were contacted within one month of submission and asked to resubmit a completed questionnaire without referring to their previous response.

Importance and difficulty for each statement was selected based on the highest number of votes received. Figure 2 illustrates the spread of importance and achievability of the 39 statements. Each numbered point refers to a statement given in appendix 1. The standard deviation of response indicated the degree of consensus obtained. This was used as a measure of confidence that the statement could be applied to a wide range of cultural heritage. Where the deviation is small this suggests that the statement may be applied equally well across a broad range of cultural heritage assets. Where the deviation is large, it suggests that generalisation may be impossible. In 31 of the 39 questions 68% of responses were "very important" or "important" demonstrating a high level of consensus, whereby only 16 of the questions demonstrated the same level of consensus for difficulty. Most respondents were more pessimistic about the difficulty of achieving positive results from the statements than they were about the importance. This is demonstrated by smaller distribution of points, between scale 1 and 2 in the x axis, compared to the greater spread of points between scale 1 and 3 in the y axis in figure 2 below.

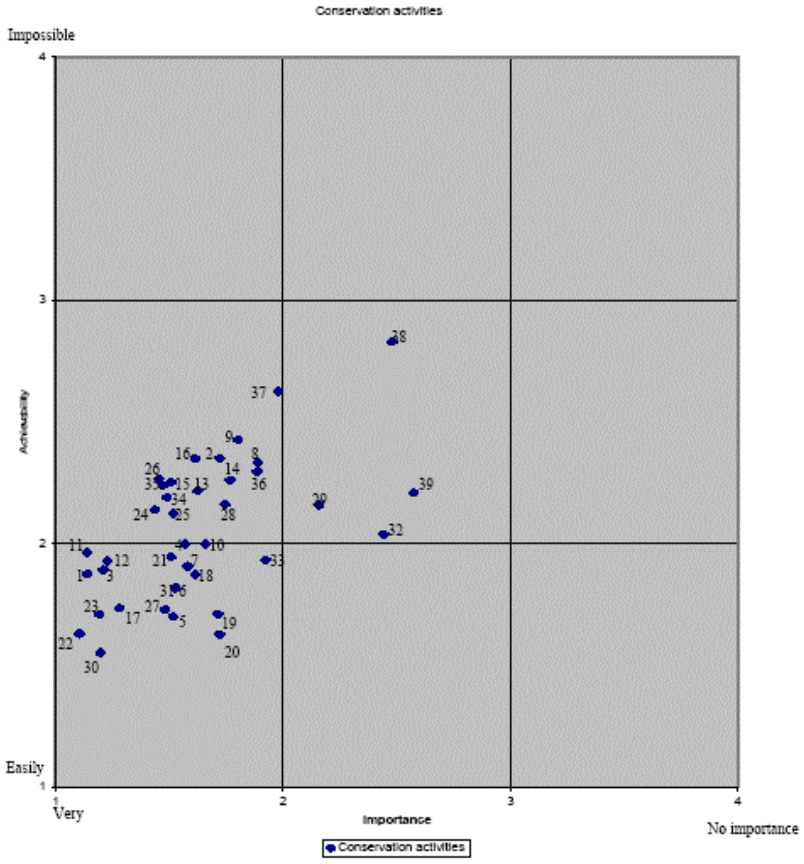

Figure 2. Spread of opinion about importance and difficulty for activities

The conclusion reached is that opinion about the importance of these statements is fairly uniform, whereby the opinion about difficulty of obtaining a positive outcome is dependent on individual circumstances. Although fairly obvious, this confirms a common view of the relevance of activities listed within the framework. Only two questions received a majority vote of "probably unachievable" or "little importance": 38. Re-establishing historic landscapes to return them back to their former condition and 39. Developing and introducing new elements into a historic landscape to improve its current social value. These are situated in centre of figure 2 as the uppermost point and the point furthest to the right. A large number of respondents also chose to offer no opinion about these statements: 5 for statement 38 and 10 for statement 39. Given that the vast majority of respondents are employed within the museum milieu, these results suggest a disconnection between cultural heritage within museum institutions and its surrounding environment. However, this observation requires further investigation before it can be confirmed and expanded. Approximately a quarter of respondents provided additional statements or comments addressing issues in the survey. The 30 additional statements underwent a similar process of categorisation and combination as had been previously conducted for the pre-screening questionnaire. Six additional statements were added and a number of original statements were replaced or improved in preparation for the Delphi survey. The results were disseminated to participants for comment.

THE DELPHI SURVEY STAGE

The single most important criterion that must be met in the Delphi communication structure is the freedom of individuals to participate when they wish and to make a contribution which addresses a particular aspect without being obliged to address all the issues at any one time (Turoff & Hiltz 1996). The World Wide Web offers an ideal platform for this type of communication structure as it allows asynchronous communication, a versatile platform for information collection and the rapid synthesis of information into a form that can be easily presented. Further benefits include; the ease with which information pages can be created and accessed. This allows the construction of interlinked cascading information levels, each of which contains progressively more detailed information. This provides a method through which varying degrees of participation can be supported. A detailed assessment of computer based Delphi processes has been published by Turoff and Hiltz and so will not be discussed here (Turoff & Hiltz, 1996).

A four round Delphi process has been constructed. This is considered to be a sufficient number of iterations for the development of performance indicators based on the activities framework and pre-Delphi testing stage discussed earlier.

The **first round** includes two tasks: the participants will be asked to rank the statements resulting from the pre-screening questionnaire in terms of contribution to the goals of conservation and scope of impact. They will then be asked to add to a list of benefits and weaknesses for each.

The **second round** presents the results of the first round. Areas of disagreement are highlighted by providing the distribution of opinion and allowing participants to comment. The participants will then be asked to identify actions that contribute towards a positive outcome for each statement and suggest indicators that could be used to measure their performance. A single action will be allowed for a number of statements if it makes a contribution to all.

The **third round** presents the list of indicators and asks collaborators to grade each in terms of seven criteria, based on the "Belagio Principles". These are general guidelines for the practical assessment towards sustainable development developed by a group of leading international practitioners and researcher (Hardi and Zdan, 1997):

1. Does the indicator (within a group of indicators) give a representative picture?
2. Is it easy to interpret?
3. Is it capable of showing trends over time?
4. Is it responsive to change?
5. Does it have threshold or reference values that represent current best practice?
6. Is it analytically sound?
7. How easily can it be measured?

The **fourth round** presents the full results as suites of indicators associated with the activity output, benefits and weaknesses. Indices that combine the contribution to conservation goals and scope of impact may offer a mechanism through which each indicator can be given a comparative weighting. The collaborators are then asked to confirm the validity of the suites and pass judgement on the value assigned to them. There will also be an opportunity to suggest alternatives and to give feedback on the survey process.

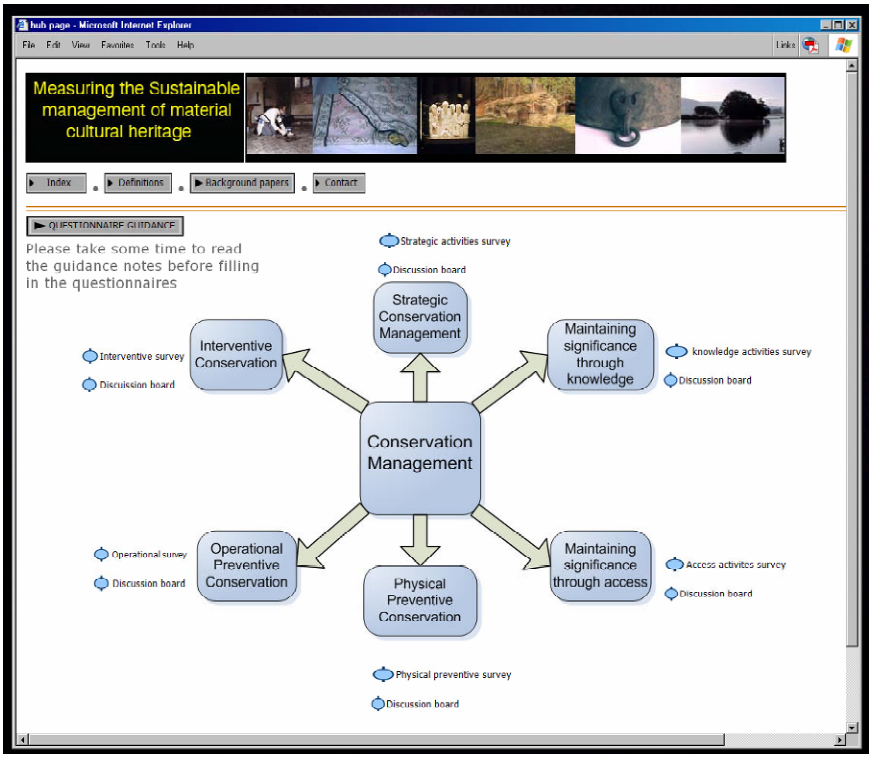

Figure 3. Web portal providing access to surveys and discussion boards

Each round uses the web portal, shown in figure 3, through which linked pages can be accessed. A circular structure has been adopted to offer a selection of topics, without an obvious order. This layout avoids linearity that can be perceived by participants as an order of importance. It thereby avoids a "top down/bottom up" approach whilst facilitating individual treatment of issues. This contributes to an important criterion of the Delphi process; individual choice over "the sequence in which to examine and contribute to a problem solving process" (Turoff and Hiltz 1996).

The statements have been divided into the six categories shown as boxes at the end of arrows in figure 3. Each category has two links, one to a short survey form containing 6 to 8 statements and the other to a discussion board where participants can read other collaborators' comments and the preliminary results. This fulfils the requirements of the Delphi technique within the constraints of the software used to construct the web site and questionnaire.

The discussion board pages and questionnaires are updated daily in order to provide a structured group view of the status of opinion at any given time. Partial anonymity is maintained through the use of log-in names which are displayed beside comments to facilitate an active dialogue. The voting status given at the end of the discussion board and the benefit and drawbacks added to the questionnaire list remain anonymous in order to reduce the commitment of individuals to ideas that may be rejected at a late date.

CONCLUDING COMMENTS

The application of this approach to the development of performance indictors for conservation management is an innovative solution as there is currently no mechanism through which conservation actions can be truly compared against each other. The research has resulted in the establishment of meaningful statements that describe conservation activities across a broad range of cultural heritage. Their fulfilment positively contributes to its goals. During the validation stage managers have already shown a great deal of interest in the project. Even without a method of performance measurement a comprehensive list of statements that describe conservation activities, ranked in terms of meaningfulness, are of great use in decision making. The framework enables not only examination of traditional aspects of cultural heritage management but also the social and environmental facets of the larger context within which managers must work. The logic-based analytical approach that has been adopted acknowledges both historical aspects as well as potential changes in future significance of an object as major factors. This allows a full evaluation of conflicting interests and thus the identification and prioritization of the range of parameters that must be measured. Protection of cultural property through activities such as risk management, emergency planning, disaster response and disaster mitigation describes only one half of the sustainability equation. The other, equally important half encompasses increased social benefit through improved access, economic justification of costs and assessment of the resource burden. Unless all of these aspects are considered within a single framework, a true balance of resources cannot be reached. This is the first framework within the cultural heritage sector to achieve this.

The use of performance indicators for conservation management increases the ability of managers to make decisions on conservation issues and monitor their outcomes. This will inevitably result in more sustainable management of these assets. The next stage of this research is to identify and assess appropriate measures of performance through the application of the Delphi survey technique. Given the spread of participants across countries within the defined region, the advantages of an internet-based survey can be summarized as follows: communication becomes faster and less costly and participants gain continuous access to the current status of the problem as delays in feedback are minimized. With the aid of databases, the tasks of tracking responses, keeping records and analysing results are facilitated. Whilst the extant mechanisms allow anonymity to be maintained, it is equally possible to track the levels of contribution and to offer encouragement to contributors with low levels of participation. The potential drawbacks that have been encountered in the developmental stage are mostly technical: interactive web site construction is both time-consuming and complex. None of the common web-based questionnaire software programs are well-suited to use of the Delphi survey as they do not support automatic updates of discussion boards. A further problem encounters during the early stage of the Delphi survey is one that is reported by Turoff and Hiltz (1996); the encouragement of people, who have signed up, to participate fully in what is a time consuming and voluntary activity. This is overcome to some degree by sending regular messages to the participants informing them of recent progress and encouraging them to make further contributions.

The methodology presented offers a systematic approach to the development of performance indicators that are capable of measuring the wide range of factors that may impact on a given outcome. It is sufficiently general that it can applied to the indicator development for a range of activities outside of the cultural heritage sector, such as the preservation of the natural environment and the provision of a service within society. It is hoped that its successful implementation and further development will enable a new level of efficiency to be achieved in both the management of cultural heritage and further afield.

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APPENDIX 1. LIST OF PRE-SCREENING STATEMENTS

1. Raising the awareness of cultural objects at local, national or international level.
2. Accidents, damage and loss can be prevented by providing appropriate legal protection at the local, regional, national and international levels.
3. Increasing the knowledge of cultural objects by informing people about their history, circumstance and the people whose lives was affected by them.
4. Increasing access to cultural objects by the public and community groups.
5. Increasing access to cultural objects by students, educators and other special interest groups.
6. Increasing access to information about cultural objects for those visiting or who cannot visit the location.
7. Increasing access to the cultural objects and their associated knowledge through searchable databases and publicly accessible web sites.
8. Identifying how cultural objects can be used in the future.
9. Promoting methods of travelling to and from the cultural site for visitors and staff other than by private car to reduce pollution and sustain the quality of life of the local community.
10. Avoiding locating a new museum on sites might damage the natural environment
11. Maintaining a museum or historic building and its services so that risk to cultural objects from failures such as leaking roof or pipes are minimised.
12. Using materials in buildings and other constructions on cultural sites that are unlikely to cause or promote damage to cultural objects.
13. Limiting the amount of non-renewable resources used in the daily running of an organisation responsible for caring for cultural objects.
14. Maximising use of locally produced materials to provide additional benefits to the local community and limit pollution from long-distance transportation.
15. Locating a new museum on sites that are not at risk from man-made or natural disasters
16. Designing or changing a museum building so that it is capable of better withstanding man-made or natural disasters
17. Early detection of threats before damage has occurred by carrying out a risk assessment and installing suitable alarm and surveillance systems.
18. Choosing levels of protection which balances access for visitor access against security.
19. Putting up barriers to block a threat at site, building, room and individual object level.
20. Placing objects in display cases provides an appropriate barrier against physical threat is an effective way of reducing the probability and severity of damage or loss.
21. Maintaining a physical presence to act as a deterrent for opportunistic crime.
22. Responding rapidly to an emergency is achieved through good planning and preparedness
23. Using work practices that are unlikely to put cultural objects at risk
24. Choosing relative humidity and temperature limits that balance the protection of cultural objects against the difficulty and cost of maintaining those conditions.
25. Protecting cultural objects by controlling the indoor climate, including humidity, temperature light and pollution, or by constructing shelters for external heritage.
26. Avoiding high energy use by monitoring conditions and selecting methods of heating and environmental control that minimises running cost whilst maintaining conditions.
27. Examining cultural objects to identify what they are made of, how they are made and how they have been used.
28. Examining cultural objects to discover how they have changed since the time that they were in use and the rate at which this change occurred.
29. Removing material from an object's surface that is judged to be hiding the objects true nature, damaging the object or distorting its original appearance.
30. Making and maintaining records of a cultural object so that information is not lost and so that it can be easily accessed in the future.
31. Maintaining cultural objects by carrying out conservation treatment to stabilize their physical and chemical condition.
32. Reconstructing an object's original form by reassembling its pieces and possibly replacing missing parts so that it can be better understood and its is in more stable condition.
33. Maintaining the condition of cultural objects by regular cleaning and reparation.
34. Maintaining appropriate levels of craftsmanship required to repair and replace historic objects by participating in training and apprenticeship programmes
35. Keeping traditional working practices "alive" by increasing the awareness of and social value of traditional skills through their demonstration and use.
36. Identifying and maintaining a good quality supply of raw material needed to carry out traditional crafts.
37. Maintaining historic landscapes in their current condition.
38. Re-establishing historic landscapes to return them back to their former condition.
39. Developing and introducing new elements into a historic landscape to improve its current social value.

APPENDIX 2. SCALES OF IMPORTANCE AND DIFFICULTY OF A CONSERVATION ACTIVITY

Very important 0-1.5	• Will have a positive effect on the long term preservation of cultural heritage with few or no negative effect. • Is extremely beneficial to overall goals of preservation • Can be justified on its own merits – produces direct conservation benefits
Important 1.5-2.5	• Will have a positive effects on the long term preservation of cultural heritage with some negative effects • Is beneficial to overall goals of conservation • Justifiable in conjunction with other Activities or produces by-products that are beneficial in terms of preservation
Little importance 2.5-3.5	• Will have negative effects on the preservation of cultural heritage that out-weigh any benefits • Will produce potentially harmful results in terms of damage and long term preservation • May be justifiable only as a by-product of very desirable and feasible Activities
Not important 3.5-4.0	• Will result in a major negative effect on the short and long term preservation of cultural heritage. • High probability of being extremely harmful to cultural heritage. • Cannot be justified in terms of effectiveness
No opinion	• Unable to give an opinion on the impact to conservation.

Importance of an activity

Easily achievable 0-1.5	• Easily implemented • Little additional effort required • Publicly acceptable • No organisational barriers
Possibly Achievable 1.5-2.5	• Implemented with some effort • Requires changes in organisation • May be unacceptable to a small proportion of the community • May be politically unacceptable
Probably unachievable 2.5-3.5	• Difficult to implement • Some indication that it is unworkable • Severe organisational barriers
Unachievable 3.5-4.0	• Cannot be implemented • All indications are negative • Unworkable
No opinion	• Unable to give an opinion on the achievability

Ease with which a good result can be achieved