

Measure Twice, Cut Once: Developing a Research-Based Interpretive Signs Checklist

Roy Ballantyne[†] & Karen Hughes
Queensland University of Technology

Abstract Interpretive signs are used extensively in tourism and leisure settings to convey important messages and concepts to visitors. While the installation of signs ensures information is widely available and can be repeatedly accessed by large numbers of visitors, their static and inflexible nature means interpretive signs have to be particularly well-designed if they are to interpret topics in a manner that visitors find attractive, interesting and meaningful. This paper provides suggestions for how the six key features of interpretation can be successfully incorporated into signs, and arises from research conducted while developing a website to illustrate “best practice” design of signs and exhibits. The paper concludes with the Interpretive Signs Checklist which consists of a set of criteria against which interpretive signs can be judged. This checklist is designed to be used “in situ”, and provides a systematic, objective tool for designing new signs as well as evaluating and improving existing signage.

Non-formal environmental education relies heavily on the use of tour guides and signs to convey information and ideas to visitors. In recent years the number of visitors to natural environments and the range of demands placed on staff working in these areas have increased. Many sites have responded to these pressures by installing “in situ” visitor signs to inform visitors about the features, events and/or objects they encounter. The principal advantage of these signs is that the information is generally available at all hours and can be repeatedly accessed by large numbers of visitors (Carter, 1997; Knudson, Cable & Beck, 1995). However, their static and inflexible nature means they have to be particularly well designed if they are to interpret the environment in a manner that is meaningful for visitors. This paper reflects on the role of interpretive signs in environmental education and arises from a literature search conducted while developing a website to illustrate “best practice” design of signs and exhibits (available at <http://www.interpretivesigns.qut.edu.au>).

Effective interpretive signs should present ideas and concepts in a format that attracts, interests and inspires visitors (Bitgood, Finlay & Woehr, 1987; Dean, 1994; Hooper-Greenhill, 1994; Knudson et al., 1995; Museums Australia, 1998). In the past, signs at environmental centres, heritage sites and trails generally focused on providing key facts about a feature or site such as dimensions, age and geographical details. In many cases, these pieces of information were only linked by virtue of the fact that

[†]*Address for correspondence:* A/Prof Roy Ballantyne, Director, Centre for Innovation in Education, Queensland University of Technology, Victoria Park Road, Kelvin Grove, Queensland 4059, Australia. Email: r.ballantyne@qut.edu.au

they pertained to the area or feature being described. Furthermore, the information presented often largely reflected the interests of rangers and/or management rather than visitors themselves (Hooper-Greenhill, 1994).

This approach is slowly changing, however, with educators and interpreters becoming increasingly aware of the importance of designing signs that are visitor-centred and interpretive (Screven, 1999). Thus, although current interpretive practices are still based on facts, the emphasis today is on translating these facts, figures and concepts into a format that attracts, interests and inspires visitors. That is, interpretive signs and displays are designed to entice visitors to read further by presenting information in a manner that connects with their beliefs, experiences, knowledge and interests. In this way, facts and figures are used to enhance stories and messages which lead to visitors' enjoyment and understanding of the places they visit (Carter, 1997; Falk & Dierking, 2000; Hooper-Greenhill, 1994; Knudson et al., 1995).

While face-to-face interpretation can be tailored to respond to the interests and questions of individual visitors, interpretive signs are relatively inflexible. They do not allow the audience to ask questions or clarify content, and consequently, must be far more exact than other forms of interpretation (Carter, 1997). It therefore behoves interpreters to be very careful in selecting both the topic and the words to accurately convey the messages intended.

Interpretive signs and exhibits have the potential to be emotionally and intellectually stimulating and, if well designed, will foster visitors' interest in, and concern about the site, feature, object and/or subject matter being interpreted. A review of literature in the fields of interpersonal communication, interpretive techniques, exhibit planning and sign design revealed that there are six criteria which must be met in order for signs and exhibits to be classified as interpretive. These are presented and discussed below.

Interpretive Signs and Exhibits are Relevant to the Intended Audience

Interpretive signs present information that visitors find interesting and exciting. To achieve this, interpreters must consider the needs, interests, knowledge and previous experiences of their visitors. While it is acknowledged that visitors differ markedly in their experiences and knowledge, it is generally accepted that those from similar backgrounds share similar conceptions (Ballantyne, 1998). Consequently, environmental educators can generalise about the likely environmental conceptions of target audiences and use this to design signs and exhibits that effectively "tap into" visitors' existing conceptions of particular features, places, events and issues.

Effective interpretive signage therefore requires designers to ask:

- "Who are my visitors?"
- "What does my target audience already know about x, y and z?"
- "What would my target audience want to know about x, y and z?"
- "What type of information/experience will give my target audience a rich appreciation and understanding of the site/feature?"

Once these issues have been explored, interpreters can design clear, simple explanations that make links between visitors' existing knowledge and new information (Ballantyne, Crabtree, Ham, Hughes & Weiler, 2000). Creating these links is vital, as according to constructivist theory, people impose meaning upon the displays and signage based on their past experience and knowledge. Thus, the exhibit material only acquires meaning once the visitor relates it to something with which they are familiar. In other words, combining isolated facts into meaningful concepts enables visitors to make connections between their previous experiences and the issues/features being

interpreted (Falk & Dierking, 1992; Hooper-Greenhill, 2000; Moscardo, 1999; Tilden, 1977). The added advantage of this approach is that recall of new information is far more likely if it relates in some way to what visitors already know (Ham, 2003; Hooper-Greenhill, 1994).

New information is related to the everyday experiences of visitors through techniques such as telling stories, posing questions, “painting” pictures using metaphors and analogies, injecting humour, and providing suggestions for ways in which new knowledge can be integrated into visitors’ day-to-day lives (Ballantyne et al., 2000; Dean, 1994; Hooper-Greenhill, 1994; Screven, 1999). As an example, a display with the theme “Cane toads – the invading army” could use these techniques (see Table 1).

Regardless of the subject matter, signs should be written in a conversational tone with limited use of jargon and technical terms. The key is to use everyday language and common experiences to give visitors clear visual images and reference points (Ballantyne et al., 2000; Dean, 1994; McManus, 1991; Knudson et al., 1995; Screven, 1999). Although the reading ability of visitors varies considerably, research indicates that signs aimed at the general public are most effective when written in language that can be understood by 10-12 year olds (Ballantyne, Hughes & Moscardo, 2002; Serrell, 1996). Text should have a conversational tone and the following characteristics:

- Short, simple sentences (no more than 15 words);
- Short, familiar words;

TABLE 1: Using interpretive techniques to convey information about cane toads

Stories	<ul style="list-style-type: none"> • Historical account of the scientists who first introduced the species into Australia • A day in the life of a cane toad • Account of what happens to native fauna when their territory is invaded by cane toads (told through the “eyes” of one particular animal)
Questions	<ul style="list-style-type: none"> • What would happen if your pet ate a cane toad? • How can we stop cane toads spreading throughout Australia? • What damage will these creatures do now they have entered Kakadu National Park?
Metaphors	<ul style="list-style-type: none"> • Cane toads – a fearless army on the march!
Analogy	<ul style="list-style-type: none"> • Like cancer, these creatures are rapidly spreading through Australia
Humour	<ul style="list-style-type: none"> • Cane toads – ten points on the pest efficiency scale! • Cane toad handbags – from ugly to glamorous!
Suggestions	<ul style="list-style-type: none"> • Is your garden a paradise for cane toads? Cane toads love moist environments – stagnant ponds and large containers that collect rainwater are perfect! They also appreciate outside lights being left on at night as these attract dinner. Are you providing a five star hotel for these creatures?

- Positive rather than negative statements (eg., “These eggs will hatch in April” rather than “These eggs will not hatch until April”);
- Expressions that use “we” and “you” and an active rather than passive voice (eg., “We think local tribes used the bark of this tree to make baskets” rather than “Historians think that the bark of this tree was used by local tribes to make baskets”); and
- Sentences using verbs rather than nouns or adjectives derived from verbs (e.g., “The number of turtles nesting on this beach has decreased” rather than “There has been a decrease in the number of turtles nesting on this beach”).

(Adapted from Coxall, 1991; Dean, 1994; Knudson et al., 1995; Punt, Stern & Ratcliffe, 1989; Serrell, 1996)

Interpretive Signs and Exhibits Have Themes

Themes are the foundation upon which facts and stories about the feature, site, object and /or event are presented. They are specific concepts and ideas that attract visitors’ attention and entice them to read further. As these themes or “big picture” concepts “hold” the facts, ideas and information together, every aspect of the interpretation should be designed to link to and support them in a meaningful way (Ham, 1992; Knudson et al., 1995; Pierssene, 1999; Regnier, Gross & Zimmerman, 1992; Serrell, 1996; Ververka, 1994).

A particular subject matter (eg., wood chipping, kookaburras, farming methods) can be interpreted using a variety of themes – it is the interpreter’s task to select the theme that best conveys the message intended. For example, themes for a display on Aboriginal rock art could include: “Aborigines have been masters of interior decorating for thousands of years”; “Aboriginal rock art – peeling back the layers of living history”; or “A handprint in time: examining the many styles of Aboriginal rock art”. The choice of themes depends on the content of the display, the information being communicated, and the core message designers want their visitors to absorb (Capelle, 1995). It is important to remember, however, that effective interpretation involves reiterating the theme/s throughout the exhibit, therefore, the theme/s chosen must logically link to other signs in the attraction (Dierking & Pollock, 1998).

To be successful, themes should be based on the objectives of both interpreters and management (Ham, 2003). Thus, if the objective is to raise awareness of the effect of land clearing on soil salinity, interpreters could design signage around themes such as “Trees give life to future plants!” or “Trees keep our soils healthy”. Although facts are used to support these claims, it is the theme rather than specific facts that visitors are most likely to remember. Indeed, according to Ham (2003), the facts themselves are relatively unimportant – it is the theme or “big idea” that interpreters should try to get across to visitors. For this reason, themes should be provocative and designed to “stick in the memory” rather like catchy tunes.

Interpretative Signs and Exhibits Provide Novel Experiences and Avoid Repetition

Research consistently shows that people pay attention to changes in their environment. Signs and displays that are repetitious in content, format and/or layout will quickly lose visitor attention, and will therefore be unsuccessful in communicating the desired messages (Moscardo, 1999; Serrell, 1996). The best way to avoid repetition is to incorporate a range of communication techniques (such as audiovisual presentations, models, computers, interactive displays), and/or vary the content (for example, using metaphors, analogies, stories and hypothetical scenarios). It must also be noted, however, that interactive exhibits only introduce variety if they are used sparingly and if the responses required from visitors also vary (Moscardo, 1996).

Other elements that introduce variety and novelty into signs and displays include:

- extreme things (eg., using very large, loud or colourful elements);
- movement (eg., turning cogs, pulleys);
- contrast (eg., elements and/or items that stand out);
- information that is unexpected or surprising (eg., “Directly under your feet is a system of limestone caves that stretch for over ten kilometres.”); and
- multi-sensory experiences (eg., opportunities for visitors to hear, smell, touch, taste).

The latter is particularly evident in immersion exhibits. These exhibits incorporate a wide range of sensory experiences (sounds, smells, sights, textures, tastes) and are designed to “immerse” visitors in the habitat/lives/experiences of other people, animals and objects. Thus, visitors are encouraged to be participants rather than observers, and through this process, meaningful and memorable visitor experiences are created (Falk & Dierking, 2000; Knudson et al., 1995; Robertshaw, 1997). Immersion experiences can have a variety of forms depending on the nature of the site and the objects and/or topics being interpreted. One thing they have in common, however, is that they are designed so that visitors feel they are really part of the exhibit. This is done by limiting the views of contradictory exhibits, buildings and other visual cues; limiting views of and interaction with other visitors; and ensuring the exhibit elements are as natural and authentic as possible (Woods, 1998).

Some examples of immersion experiences include:

- Indoor jungles complete with the sounds of animals and the smell of rainforest plants;
- Historic sites with costumed characters and “parts” that visitors are required to act;
- “Time car” travel where visitors travel through a reconstructed village to view, hear and smell what it would have been like in the past; and
- A rabbit “burrow” with ladders leading up to exits where visitors can peek out to view the surrounding forest from a rabbit’s perspective. Logs, trees, the sound of birds, the “zzz” of bees, and the “smell” of the damp forest floor all help to create the ambience of the forest.

Interpretive Signs and Exhibits Have Clear, Organised Structures

Writing in a clear, logical order that divides information into an introduction, body and conclusion enhances visitor learning and comprehension (Ballantyne et al., 2002; Hooper-Greenhill, 1994). The introduction should provide visitors with an overview of the topics or activities to follow, and sets the tone of the whole display or sign. It also includes definitions of any terms or concepts that are integral to the understanding of the information being presented (Moscardo, 1998). This is critical, because as mentioned, visitors arrive with prior knowledge, attitudes and conceptions that may affect the way in which the sign is understood. Thus, interpreters must minimise possible distortion of the intended message by clearly and logically introducing the topic at the very beginning of the exhibit (Screven, 1999).

A well-organised interpretive sign is preceded by a title that acts as a “hook” to entice visitors to read further. To be effective, these titles should be interesting and thought-provoking, but not trite, clichéd or loaded with jargon (Dean, 1994). The “body” of the sign refers to information about the topic and generally should contain no more than five main ideas or concepts (Ham, 1992; Hooper-Greenhill, 1994). It comprises concepts that interpreters feel are central to visitors’ understanding and appreciation

of the topics under discussion. Generally, the selection of concepts and presentation techniques is guided by what the designer wants visitors to learn, feel or do as a consequence of reading their signs (Ballantyne et al., 2000). These “consequences” are further reinforced in the conclusion, which if applicable, may also provide suggestions on how visitors can use their newly acquired knowledge. Conclusions are the interpreters’ chance to “pack a punch”, to drive home the main message, to summarise the exhibit in a powerful way, to encourage reflection and/or to emphasise highlights of the sign/exhibit (Knudson et al., 1995).

Interpretive Signs and Exhibits Facilitate Visitor Involvement and Choice

A growing body of research indicates that visitor interest and learning is heightened by activities that require participation. This participation can be cognitive (e.g., questions and quizzes) or physical (e.g., panning for gold, chipping stone flints). Interactive elements need not be highly technical and can include simple hands-on displays such as tactile signs and models, “feely” boxes, tape recordings, odours related to the objects being interpreted and so on. As signs are generally visual, interactive elements that stimulate other senses are generally well-received (Ham, 1992). Wherever possible, signs and activities should be fun as this has been shown to facilitate learning and recall. The key requirement, however, is that visitor interaction is meaningful and relates to the theme in some way (Caulton, 1998; Screven, 1999; Thomas, 1994). Interactive components should not be included merely for the sake of it.

Signs that require visitor participation help personalise the experience and give visitors the sense that they have some control over their experience. Research suggests that this sense of control is associated with greater enjoyment, higher levels of perceived learning and longer time spent at the exhibit (Falk & Dierking, 2000; Moscardo, 1996). The other major advantage of designing signs that require visitor involvement and choice is that the topic “comes alive” and has the potential to affect the emotions, attitudes and values of visitors (Ballantyne et al., 2000).

Visitors’ attitudes and emotions can also be addressed through “hot” interpretation, a technique that involves incorporating emotion into signs and displays in order to provoke cognitive and behavioural responses. The term “hot” interpretation refers to the practice of using the passion and commitment raised by the subject matter to fuel the power, persuasiveness and significance of the messages communicated. The aim of this type of interpretation is to “engage the public’s attention and challenge them to examine their attitudes and actions with respect to specific social, environmental, and moral issues” (Ballantyne & Uzzell, 1993, p. 5). “Hot” interpretation is particularly suited to emotive or contentious issues (eg., land clearing, war, human rights) because it enables interpreters to directly address the emotions, stories and experiences of those involved in the events being depicted (Machlis, 1992; Shackley, 2001; Uzzell & Ballantyne, 1998).

Interpretive Signs and Exhibits Respect the Audience

Interpreters often assume that visitors share their specialist knowledge and interest in particular topics - this is clearly not the case. While research does not advocate the practice of treating visitors as uninformed, it does suggest that providing a hierarchy of information that allows visitors to “enter” the interpretive sign at their “level” is not only clever but essential (Carter, 1997; Caulton, 1998; Falk & Dierking, 2000; Hooper-Greenhill, 1994; Museums Australia, 1998). Thus, signs should be written in a series of “layers” with key information in large print and more complex information in subsequent smaller sections. This not only makes signs easier to read, it also enables visitors to select the “level” of detail they wish to access (see Table 2).

TABLE 2: Designing signs using layering techniques

Level 1	Title (Including an introduction of the theme/message)
Level 2	Subheadings that divide the text
Level 3	Main body of text and key illustrations Layer 1: Main example of the theme/message (intended for all readers) Layer 2: More examples and fairly general information Layer 3: Detailed information for those who have specialist knowledge/interests
Level 4	Conclusion (reiteration of theme; suggestions for putting new information into practice)

The Interpretive Signs Checklist

So how do environmental educators check that their signs and exhibits are in fact interpretive? The most effective method is to conduct thorough evaluation (Serrell, 1996). This can be done prior to design (front-end evaluation); during the design phase (formative evaluation); and once the design is complete (summative evaluation). It is argued that simply asking visitors whether or not they enjoyed the experience cannot be classified as serious evaluation. Rather, effective evaluation involves:

- ensuring that the style, content and placement of signs is appropriate for the target audience;
- ensuring the principle messages and themes are clearly stated;
- checking that current and potential visitors are interested in the content/format of the display;
- examining what visitors learn as a result of the visitor experience (knowledge, skills, attitudes, behaviour);
- specifying strengths and weaknesses; and
- identifying any improvements that would enhance learning, enjoyment and repeat visitation.

(Caulton, 1998; Hooper-Greenhill, 1994; Hooper-Greenhill, 1995; Punt et al., 1989; Serrell, 1996; Ververka, 2001)

The importance of conducting evaluation at all stages of design and implementation cannot be overstated. Unless this is done carefully and consistently, interpreters run the risk of developing products in a vacuum, without any clear idea of how visitor characteristics and exhibit variables interact to create positive visitor experiences (Pasini, 1999; Thomas, 1994). Arguably, one of the cheapest and quickest methods of evaluating and improving interpretive signs is by using a checklist. Checklists consist of a set of criteria against which the interpretive product is judged. They provide interpreters with a rigorous, systematic and reasonably objective method of evaluating their signs and exhibits. Furthermore, they enable interpreters to identify specific problems within complex displays and provide pointers for how to improve deficient design elements (Ballantyne & Uzzell, 1994).

The Interpretive Signs Checklist was developed to encourage and assist interpreters to critically evaluate their signs. It is based on the six principles of effective interpretive signs discussed above, but also includes items relating to the formatting, construction and placement of interpretive signage. The checklist is specifically designed to be used "in situ" either prior to and/or in conjunction with visitor evaluation. Its format will

enable interpreters to use it for designing new signs as well as improving existing ones.

Interpretive signs and exhibits are relevant to the intended audience.

- Have the main visitor group/s been identified?
- Have visitors' likely interests and needs been documented?
- Have visitors' previous experiences and knowledge been considered?
- Is the information relevant for the target audience? In particular, does it "connect with" their previous knowledge and experiences?
- Does interpretation build on experiences visitors may have had at other sites/attractions in the area?
- Is the interpretation sensitive to the different social and cultural backgrounds of visitors?
- Does interpretation take into account the needs and limitations of "special" groups (eg., families and visitors with disabilities)?
- Could some visitors (eg., children and those in wheelchairs) have difficulty accessing signage and/or interactive displays?
- Have metaphors, analogies and personal stories been used to present information?
- Has humour been used where appropriate?
- Are sentences short and easy to understand?
- Does the level of language match the reading ability of the target audience?

Interpretive signs and exhibits have themes

- Has the major topic/s been identified?
- Have core themes/messages based on the topic/s been developed?
- Do core themes/messages focus on the special/rare/different characteristics of the site or attraction?
- Are the themes/messages clearly stated?
- Are the themes/messages supported by stories and information?
- Are the core themes reiterated throughout the exhibit/site?
- Have local activities or events (eg., festivals, workshops, bushwalks) that link to the themes/site been mentioned?

Interpretative signs and exhibits provide novel experiences and avoid repetition

- Is the content interesting, surprising and/or thought provoking?
- Is the information presented accurate and up-to-date?
- Does the interpretation include a range of presentation techniques (eg., flaps, models, quizzes, audio visual components)?
- Have movement, contrast, colour and/or extreme elements been incorporated into signage?
- Does the interpretation require visitors to use different senses (eg., touch, smell, hearing)?

Interpretive signs and exhibits have clear, organised structures.

- Have catchy titles been used to attract visitors' attention?
- Is the content clearly organised into an introduction, body and conclusion?
- Does the introduction include clear explanations of central terms and concepts?
- Does the conclusion clearly reinforce the messages and concepts discussed?

- Does the conclusion suggest ways in which new information can be integrated into visitors' daily lives?

Interpretive signs and exhibits facilitate visitor involvement and choice

- Does the interpretation encourage visitors to solve problems and/or make decisions?
- Do signs and displays ask visitors stimulating and appropriate questions?
- Does the content engage visitors' emotions?

Interpretive signs and exhibits respect the audience

- Are signs written in "layers"?
- Are there any sentences that could have double meanings or be interpreted in a manner not intended?

Additional design issues

- Is the font and size of text easy to read?
- Is the text well spaced?
- Do the colours chosen for text, illustrations and background match the sign's content and tone?
- Do illustrations match and enhance the sign content?
- Are illustrations clear and easy to see?
- Does the placement of text and illustrations look balanced?
- Do the construction materials reflect the "feel" of the sign/display content?
- Are the materials durable enough for the intended purpose?
- Have issues of maintenance, vandalism and longevity been considered?
- Are signs placed where visitors will see them (eg., in direct line of vision, at natural stopping points)?
- If signs aren't directly in front of the attraction, are they within easy viewing distance and clearly matched to the feature/s being described?
- Is there enough space for people to view signage in comfort?
- Have seats been provided where appropriate?
- Has reflection from natural and artificial light been minimised?
- Are the colours used appropriate for the available lighting conditions?

Conclusion

The need to design interpretive signs that enhance visitor experiences and understanding has been widely advocated by researchers, interpreters and environmental educators alike. Well-written signs have the power to influence the attitudes, experiences and values of visitors, and can play a key role in developing positive environmental attitudes and behaviour (Ballantyne et al., 2002; Pierssene, 1999). Thus, the development of instructional materials and guidelines that hone the interpretive skills of those working at the forefront of environmental education and interpretation is vital if Australia's unique and fragile environments are to be preserved for future generations.

Although there is evidence of strong theme development and interpretive planning at many visitor sites in Australia (Ham, 2003), there are still many places where signs present information rather than interpretation. Accordingly, the Interpretive Signs Checklist has been developed to facilitate the adoption of interpretive techniques by

enabling educators and interpreters to pinpoint the strengths and weaknesses of their signs and explore ways in which improvements can be made. The specific nature of the questions should facilitate this process and encourage staff to engage in regular rigorous evaluation of their signs and exhibits. It is envisaged that this checklist will empower staff to design signs that are more interpretive in nature - signs that inspire, excite and motivate visitors to respond and behave in a manner consistent with management's goals and objectives.

References

- Ballantyne, R. (1998). Interpreting "visions": Addressing environmental education goals through interpretation. In D. Uzzell & R. Ballantyne, *Contemporary Issues in Heritage and Environmental Interpretation* (pp. 77-97). London: The Stationery Office.
- Ballantyne, R., Crabtree, A., Ham, S., Hughes, K., & Weiler, B. (2000). *Tour guiding: Developing effective communication and interpretation techniques*. Brisbane, Australia: Queensland University of Technology.
- Ballantyne, R., Hughes, K., & Moscardo, G. (2002). Interpretive signs: Principles and practices. <http://www.interpretivesigns.qut.edu.au>
- Ballantyne, R., & Uzzell, D. (1993). Environmental mediation and hot interpretation - a case study of District Six, Cape Town. *Journal of Environmental Education*, 24(3), 4-7.
- Ballantyne, R., & Uzzell, D. (1994). A checklist for the critical evaluation of informal environmental learning experiences. *International Journal of Environmental Education and Information*, 13(2), 111-124.
- Bitgood, S.C., Finlay, T., & Woehr, D. (1987, March). *Design and evaluation of exhibit labels*. Paper presented at the Southeastern Psychological Association, Atlanta, GA.
- Capelle, A.D. (1995). Designing quality interpretive/EE programs: Meeting the expectations of a sophisticated clientele. *Interp Edge*, 2(2), 33-36.
- Carter, J. (Ed.). (1997). *A sense of place: An interpretive planning handbook*. Inverness: Tourism and Environmental Initiative.
- Caulton, T. (1998). *Hands-on exhibitions: Managing interactive museums and science centres*. London: Routledge.
- Coxall, H. (1991). How language means: An alternative view of museums text. In G. Kavanagh (Ed.), *Museum languages: Objects and texts* (pp. 83-100). Leicester: Leicester University Press.
- Dean, D. (1994). *Museum exhibition: Theory and practice*. London: Routledge.
- Dierking, L.D., & Pollock, W. (1998). *Questioning assumptions: An introduction to front-end studies in museums*. Washington: The Association of Science-Technology Centers.
- Falk, J.H., & Dierking, L.D. (1992). *The museum experience*. Washington DC: Whalesback Books.
- Falk, J.H., & Dierking, L.D. (2000). *Learning from museums: Visitor experiences and the making of meaning*. Walnut Creek, CA: Alta Mira Press.
- Ham, S.H. (1992). *Environmental interpretation: A practical guide for people with big ideas and small budgets*. Golden, Colorado: North American Press.
- Ham, S. (2003). *Re: New interpretation article*. <http://www.interp@lorenz.mur.csu.edu.au>
- Hooper-Greenhill, E. (1994). *Museums and their visitors*. London: Routledge.
- Hooper-Greenhill, E. (1995). *Museum, media, message*. London: Routledge.

- Hooper-Greenhill, E. (2000). *Museums and the interpretation of visual culture*. London: Routledge.
- Knudson, D.M., Cable, T.T., & Beck, L. (1995). *Interpretation of cultural and natural resources*. PA: Venture Publishing.
- Machlis, G.E. (1992). Interpreting war and peace. In G.E. Machlis & D.R. Field (Eds.), *On interpretation: Sociology for interpreters of natural and cultural history* (Revised edition) (pp. 212-234). Corvallis, Oregon: Oregon State University Press.
- McManus, P.M. (1991). Making sense of exhibits. In G. Kavanagh, *Museum languages: Objects and text* (pp. 35-46). Leicester: Leicester University Press.
- Moscardo, G. (1996). Mindful visitors. *Annals of Tourism Research*, 23(2), 376-397.
- Moscardo, G. (1998). Interpretation and sustainable tourism: Functions, examples and principles. *Journal of Tourism Studies*, 9(1), 2-13.
- Moscardo, G. (1999). *Making visitors mindful: Principles for creating sustainable visitor experiences through effective communication*. Champaign, Illinois: Sagamore Publishing.
- Museums Australia (1998). *Museum methods: A practical manual for managing small museums*. Sydney: Museums Australia.
- Pasini, R. (1999). Sign-posting information design. In R. Jacobson (Ed.), *Information Design* (pp. 83-98). Cambridge, Massachusetts: The MIT Press.
- Pierssene, A. (1999). *Explaining our world: An approach to the art of environmental interpretation*. London: E & FN Spon.
- Punt, B., Stern, S., & Ratcliffe, S. (1989). *Doing it right: A workbook for improving exhibit labels*. Brooklyn: The Brooklyn Children's Museum.
- Regnier, K., Gross, M., & Zimmerman, R. (1992). *The interpreter's guidebook: Techniques for programs and presentations*. University of Wisconsin: UW-SP Foundation Press Inc.
- Robertshaw, A. (1997). *A dry shell of the past: living history and the interpretation of historic houses*. <http://www.heritage-interpretation.org.uk/journals/j2c-shell.html>
- Shackley, M. (2001). *Managing sacred sites: Service provision and visitor experience*. London: Continuum.
- Screven, C.G. (1999). Information design in informal settings: Museums and other public spaces. In R. Jacobson (Ed.), *Information Design* (pp. 131-192). Cambridge, Massachusetts: The MIT Press.
- Serrell, B. (1996). *Exhibit labels: An interpretive approach*. Walnut Creek, CA: Alta Mira Press.
- Thomas, G. (1994). "Why are you playing at washing up again?" Some reasons and methods for developing exhibitions for children. In R. Miles & L. Zavala, *Towards the museum of the future* (pp. 117-131). London: Routledge.
- Tilden, F. (1977). *Interpreting our heritage*. Chapel Hill: University of North Carolina Press.
- Uzzell, D.L., & Ballantyne, R.R. (1998). Heritage that hurts: Interpretation in a postmodern world. In D. Uzzell & R. Ballantyne (Eds.), *Contemporary issues in heritage and environmental interpretation* (pp. 152-171). London: The Stationery Office.
- Ververka, J.A. (1994). *Interpretive master planning: For parks, historic sites, forests, zoos and related tourism sites, for self-guided interpretive services, for interpretive exhibits, for guided programs/tours*. Montana: Falcon Press Publishing Company.
- Ververka, J.A. (2001). *Exhibit evaluation for children's exhibits: The Kirby Science Center Experience*. <http://www.heritageinterp.com/newpage13.htm>
- Woods, B. (1998). Animals on display: Principles for interpreting captive wildlife. *The Journal of Tourism Studies*, 9(1), 28-39.