Linking Interpretation Best Practices with Outcomes: A Review of Literature

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Key Findings

***The results of our review of seminal works in interpretation identified a relatively consistent list of 17 recommended field techniques or best practices.**

***Our examination of peer reviewed literature and subsequent analyses suggest that there is some empirical support for the "consensus" best practices, which were consistently linked with positive outcomes.**

***The examination of peer reviewed articles and subsequent analyses also suggest that this support is only circumstantial (correlational), because these practices were rarely isolated and explicitly tested. In addition, small sample sizes limit our ability to generalize about the relative effectiveness of many of the proposed best practices.**

*** In summary, consensus-based best practices are circumstantially supported by recent empirical literature, but a more rigorous study that could isolate the impacts of specific best practices upon specific outcomes would provide a more stringent test of these relationships than the current literature reveals.**

Other Findings

*** In the examination of peer reviewed articles, knowledge was the most prevalently evaluated outcome.**

*** Attitudes and behaviors appeared to be the most difficult outcomes to influence, which supports the notion that they are much more complex psychological constructs than satisfaction, awareness, and knowledge.**

INTRODUCTION

As part of an effort to develop high quality indicators for measuring the effectiveness of Interpretation, Education, and Visitor Orientation (IEVO) in the National Park Service (NPS), we undertook a two-phased study to identify consensus-based best practices for interpretation and to examine the empirical evidence supporting those best practices. The goal in conducting this analysis was to identify research trends which demonstrate linkages between interpretation practices and outcomes desired by the NPS. By reviewing empirical support for proposed best practices, this analysis also sought to identify gaps in the literature about which practices lead to desired outcomes in specific contexts.

For the purposes of this report, interpretation was defined using Tilden's (1957) definition:

> *"An educational activity which aims to reveal meanings and relationships through the use of original objects, by firsthand experience, and by illustrative media, rather than simple communication of factual information." (p 8)*

Discussion with the NPS Standards Working Group led to a further clarification of this definition to include *public educational programs that are provided by the NPS regarding a sites' natural and cultural resources.* These programs focus primarily on non-captive audiences and can be formal, scheduled activities and/or informal contacts. These definitions were used to differentiate interpretation from environmental education programs offered by the National Park Service; which were defined as: 'typically curriculum-based, formal scheduled programs with school groups that are geared to a specific age group and curriculum and tied to park natural or cultural history themes.'

To create an inventory of best practices, we reviewed professionally acknowledged key sources such as Mills (2001) and Tilden (1957), as well as more recent contributions from Ham (1992), Beck & Cable (2002) Knudson et al. (2003), Lewis (2005), Sharpe (1976), the NPS's Interpretive Development Program (http://www.nps.gov/idp/interp/standard.htm), and the National Association for Interpretation's (NAI) certification programs (http://www.interpnet.com/certification/index.shtml). These texts have served as the main body for defining both the discipline and practice of interpretation.

Although many suggested best practices are based on early interpretation research as well as social psychological, communication, marketing, and education theory and research, our second objective was to document the current empirical support for these hypothesized best practices and their relationship to specific visitor outcomes in modern day interpretive contexts. We conducted a review of research that measured the influence of interpretive programs on the following visitor outcomes: satisfaction, awareness, knowledge, attitudes, intentions, and behavior. In this review, we identified the

best practices used by each program to be able to identify linkages with the programs' specified outcomes in an attempt to identify consistent relationships. This was intended to identify which best practices were supported empirically and which may need further research regarding their effectiveness.

METHODS

Identification of Best Practices

The two primary objectives of this report were to produce a list of 'consensus' best practices that could be empirically tested and to conduct a review of the literature to investigate the influence of these practices on specific outcomes. In order to determine best practices, we selected and reviewed seminal works in interpretation that provided practitioners practical guidelines for presenting and improving interpretation. We also identified and reviewed additional sources such as professional certification programs, including NPS training manuals. For a list of resources used in compiling the list of best practices, please refer to Appendix A.

Support for Best Practices in Empirical Research

To investigate whether these best practices are supported by empirical research, we reviewed all abstracts from articles published between 1996 and August, 2009 in the following peer reviewed journals: Journal of Ecotourism, Journal of Interpretation Research, Journal of Leisure Research, Journal of Park and Recreation Administration, Journal of Sustainable Tourism, Leisure Sciences, and Society and Natural Resources (Table 1).

Table 1: Sample of Journals.

Name of Journal	Years Surveyed
Journal of Ecotourism	2002 – 8/2009
Journal of Interpretation Research	1996 – 8/2009
Journal of Leisure Research	1996 – 8/2009
Journal of Park and Recreation Administration	1996 – 8/2009
Journal of Sustainable Tourism	1996 – 8/2009
Leisure Sciences	1996 – 8/2009
Society and Natural Resources	1996 – 8/2009

We included articles for analysis if the study evaluated the influence of an interpretive program on visitors' outcomes. This review identified 37 articles that met this criterion. Selected articles included assessments of: first-person programs, mixed media delivery (e.g. brochures, signage, videos, maps), and informal contact (e.g. information booths and visitor centers). Excluded from this review were meta-analyses, theory reviews, and management framework recommendations and analyses, as

well as articles in which the evaluated audience was not the direct recipient of an interpretive program. Bibliographies from the 37 articles were searched to find additional studies that met our criterion. EBSCO and Web of Science were also used to generate citation maps to identify articles which cited the original 37 articles. These searches generated 33 additional articles meeting the study criterion, producing 70 total articles from 24 peer reviewed journals (see Table 2). Following is a summary of the criteria used to select research articles included in this analysis:

- There was clear evidence that subjects were exposed to an interpretive program.
- At least one outcome (satisfaction, knowledge, awareness, attitudes, intentions, or behavior) was assessed.
- Assessment of outcomes was conducted by sampling the recipients of the interpretive program.
- A description of the interpretive program was sufficient enough to identify the presence or absence of program characteristics associated with identified best practices.

Table 2: Articles Selected by Journal

Journal	Number of Articles Selected
Applied Environmental Education Communication	3
Conservation Biology	1
Curator	2
Environment & Behavior	1
Environmental Education Research	1
Environmental Management	1
Human Dimensions of Wildlife	2
International Journal of Science Education	1
Journal of Ecotourism	3
Journal of Environmental Education	4
Journal of Forestry	1
Journal of Interpretation Research	26
Journal of Leisure Research	2
Journal of Park & Recreation Administration	1
Journal of Research in Science Teaching	1
Journal of Sustainable Tourism	9
Journal of Tourism Studies	1
Leisure Sciences	1
Park Science	1
Polar Record	1
Progress in Tourism & Hospitality Research	1
Science Education	1
Society & Natural Resources	2
Tourism Management	3

We began our review of articles in 1996 because of the substantive changes in societal recreational patterns, interest in the outdoors, communication technologies, and the ways that people prefer to receive and process information (e.g., Louv, 2005; Cordell, 1999, 2008). These societal changes are reflected in the on-going evolution and maturation of the field of interpretation. Given these trends, we believed 14 years to be a reasonable time period in which to assume the applicability of study results.

Coding

We organized the 70 articles based on assessed outcomes. We coded outcomes into one or more of the following categories: Satisfaction, Awareness, Knowledge, Attitudes, Behavioral Intentions, and Behavior. See below for operational definitions of each.

We also reviewed each article's description of the interpretive program to identify all best practices employed by the interpretive delivery system. These best practices were coded based on 17 best practices identified in Phase One of the study that appeared theoretically important for predicting desired outcomes (see Table 3). Presence or absence was noted for each practice.

Operational Definitions of Outcomes

We used the following outcomes to categorize and sort each article:

***Satisfaction*:** individual participants' overall satisfaction or enjoyment levels associated with the interpretive experience (e.g., Oliver, 1993; Powell & Ham, 2008).

***Awareness*:** individual participants' change in understanding (Knapp & Volk, 1997), and/or meanings attached to the site or subject being interpreted.

Knowledge: individual participants' change in knowledge of subject after exposure to interpretation.

Attitudes: individual participants' change in attitude toward subject of interpretation (Ajzen & Fishbein, 1977).

Behavioral Intentions: individual participants' self-reported intent to change a behavior after exposure to interpretation (e.g., Powell & Ham, 2008; Powell et. al. 2009).

Behavior: individual participants' self-reported behavior change, or staff observations of behavior change following exposure to interpretation (e.g. Powell & Ham 2008).

RESULTS

Review of Seminal Works for Best Practices

A total of 17 texts were examined. . Appendix A contains a complete list of texts included in the review. Our review produced a list of 17 "best practices." Table 3 lists and defines these 17 best practices and provides corresponding citations. Of these, 13 may be applied to all outcomes. The remaining 4 were specific to influencing behavioral intentions and/or behaviors.

TABLE 3: Best Practices and Operational Definitions

Best Practices	Operational Definition	References*
Theme development (TD)	The interpretation delivery system had a clear theme(s).	(Beck & Cable, 2002; Brochu & Merriman, 2002; Ham, 1992; Knudson, Cable, & Beck, 2003; Lewis, 2005; Moscardo, 1999; Sharpe, 1976; Tilden, 1957; Veverka, 1998; Widner Ward & Wilkinson, 2006)
Link tangibles to intangibles to universals (LI)	The interpretation made a link between tangible and intangible concepts and objects and demonstrated the relationship to universal concepts.	NPS Module 101;(Beck & Cable, 2002; Brochu & Merriman, 2002; Ham, 1992; Knudson, et al., 2003; Lewis, 2005; Moscardo, 1999; Tilden, 1957; Widner Ward & Wilkinson, 2006)
Multisensory (MS)	The interpretation delivery system was intentionally designed to engage multiple senses.	(Knudson, et al., 2003; Lewis, 2005; Moscardo, 1999; Tilden, 1957; Veverka, 1998)
Actively engage audience (AE)	The interpretation was designed to allow the audience to actively engage in the interpretive experience.	(Knudson, et al., 2003; Moscardo, 1999; Sharpe, 1976; Tilden, 1957; Veverka, 1998)
Multiple activities (MU)	The interpretive experience consisted of a variety of activities and opportunities for direct audience involvement.	(Moscardo, 1999; Widner Ward & Wilkinson, 2006)
Multiple delivery styles (MD)	The interpretation delivery system employed a mixture of first person interpretation, brochures, signs, exhibits etc.	(Knudson, et al., 2003; Moscardo, 1999)
Relevance to audience (RA)	The interpretive delivery system communicated the relevance of the subject to the lives of the audience.	(Beck & Cable, 2002; Brochu & Merriman, 2002; Ham, 1992; Jacobson, 1999; Lewis, 2005; Moscardo, 1999; Sharpe, 1976; Veverka, 1998); NPS Module 101
Resource and place based messaging (PB)	The interpretive message emphasized the relationship between the visitor and the site/resource	(Beck & Cable, 2002; Knudson, et al., 2003; Lewis, 2005; Moscardo, 1999; Sharpe, 1976); NPS Module 101
Physical engagement with the resource (PE)	The interpretation intentionally provided direct physical experiences and interactions with the site/resource to build relationships between the visitor and the site/resource	(Beck & Cable, 2002; Knudson, et al., 2003; Lewis, 2005; Moscardo, 1999; Sharpe, 1976); NPS Module 101; Tilden, 1957

Tailored to audience (TA)	The interpretation was developed for a specific pre-defined audience or user group.	(Brochu & Merriman, 2002; Ham, 1992; Jacobson, 1999; Moscardo, 1999; Sharpe, 1976); NPS Module 101
Accurate Fact-based messaging (CM)	The interpretation emphasized accurate fact-based messages.	(Jacobson, 1999; Lewis, 2005; Tilden, 1957; Widner Ward & Wilkinson, 2006)
Affective messaging (AM)	The interpretation emphasized affective messages.	(Jacobson, 1999; Lewis, 2005; Tilden, 1957; Widner Ward & Wilkinson, 2006)
Cognitive/Affective messaging (CAM)	The interpretation used a combination of cognitive and affective messages.	(Jacobson, 1999; Lewis, 2005; Tilden, 1957; Widner Ward & Wilkinson, 2006)
Best Practices Specific to Influencing Intentions and Behaviors	**Operational Definition**	**References**
Demonstrates benefits of action (BA)	The interpretation emphasized the potential benefits resulting from performing a particular action(s).	Ham et. al., 2007; (Jacobson, 1999; Knudson, et al., 2003; Moscardo, 1999)
Social norms (SN)	The interpretation emphasized the social acceptability of performing a particular behavior or desired action.	Ham et. al., 2007; (Jacobson, 1999; Knudson, et al., 2003; Moscardo, 1999)
Ease of action (EA)	The interpretation communicated the ease of performing a particular behavior or desired action.	Ham et. al., 2007; (Jacobson, 1999; Knudson, et al., 2003; Moscardo, 1999; Tilden, 1957)
Demonstrates action (DA)	The interpretation provided examples of, or opportunities for, performing a desired action(s).	(Beck & Cable, 2002; Knudson, et al., 2003; Moscardo, 1999; Sharpe, 1976; Widner Ward & Wilkinson, 2006)

** For full references see Appendix A.*

Review of Interpretive Research Articles

A total of 70 articles from 24 journals were selected for the analysis. Appendix B contains a complete list of the articles included in the analysis. Table 4 presents a summary of the characteristics of the interpretive programs evaluated by these 70 articles. Eighty-four percent of the programs targeted the general public. In these 70 articles, the audience was generally non-captive (81%). In the studied programs, the predominant delivery method was first person interpretive programs (57%). These programs were most frequently in The United States of America and Australia, 60% and 30% respectively. All of the studies outside of the USA and Australia were conducted by western, i.e. non-resident, researchers.

Table 4: Summary of Interpretive Programs Characteristics

	# of Articles (n=70)	Percentage
Audience Demographics		
General Public	59	84%
Specific activity group	7	10%
Children (4^{th} – 6^{th} grade)	4	6%
Audience Role		
Non-captive	51	81%
Captive	19	19%
Program Delivery		
First Person	40	57%
Mixed Media	17	24%
Signage	9	13%
Print/brochure	3	4%
Self-guided	1	2%
Location		
United States	42	60%
Australia	21	30%
Ecuador	2	3%
Antarctica	1	1%
Belize	1	1%
Canada	1	1%
Korea	1	1%
Panama	1	1%

Table 5 presents a summary of research methods employed in the 70 articles. The studies were predominantly quantitative (76%), though nearly one-quarter employed qualitative methods. Most (78%) of the studies assessed outcomes immediately after a program. Longer-term assessments occurred in 22% of the studies (Table 5).

Table 5: Research Methods and Design Characteristics

	Number	Percent
Methodology		
Qualitative	8	11%
Quantitative	53	76%
Mixed	9	13%
Sample Size		
1– 100	16	23%
101 – 200	14	20%
201- 300	13	19%
301 – 400	9	13%
401 – 500	7	10%
501 – 1000	6	9%
1001-1500	1	1%
1501 – 3000	3	4%
<3000	1	1%
Timing of post-program data collection n=72*		
Immediate	56	78%
1 week – 6 months	11	16%
6 – 12 months	3	4%
1 – 2 years	1	1%
2+ years	1	1%

**Two studies used immediate and a longer-term follow up data collection technique; percentage calculated on n=72.*

Of the 70 articles, 25 measured more than one outcome (see Table 6 & 7). This yielded a total of 111 outcome assessments. Of the six outcome categories, knowledge and attitudes were investigated in the largest number of studies. Eighty percent of assessments reported positive effects on the outcome. Only 22 (20%) of the 111 assessments reported results that had no effect on the outcome. Of those, attitudes were the most frequent, with eight (7%) assessments.

Table 6: Summary of Evaluated Outcomes

Outcome	Number of times outcome was evaluated*	Total Percentage‡	Number of evaluations w/positive results*	Percent^	Number of evaluations w/no impact*	Percent^
Satisfaction	11	10%	10	91%	1	9%
Awareness	10	9%	9	90%	1	10%
Knowledge	37	33%	33	89%	4	11%
Attitudes	25	23%	17	68%	8	32%
Intentions	15	13%	11	73%	4	27%
Behavior	13	12%	9	69%	4	31%

**Count exceeds 70 due to articles with more than 1 evaluated outcome*

‡*Percentage calculated on n=111*

^*Percentage calculated on total number of times outcome was evaluated*

Table 7: Evaluated Outcomes in Articles Surveyed

Outcome	Articles*
Satisfaction	Anderson et al, 2008; Ballantyne et al, 1998; Beckmann, 1999; Ham & Weiler, 2002, 2007; Hughes & Morrison-Saunders, 2002; Morgan & Dong, 2008; Orams, 1997; Powell & Ham, 2008; Randall & Rollins, 2009; Weiler, 1999
Awareness	Adelman et al, 2000; Ballantyne & Hughes, 2006; Benton, 2009; Christensen et al, 2007; Frauman & Norman, 2003; Goldman et al, 2001; Morgan, 2009; Moscardo, 1999; Silverman & Masberg, 2001; Stewart et al, 1998
Knowledge	Adelman et al, 2000; Armstrong & Weiler, 2002; Beaumont, 2001; Bright et al, 1993; Brody et al, 2002; Carr, 2004; Cole et al, 1997; Engels & Jacobson, 2007; Falk & Adelman, 2003; Falk & Storksdieck, 2005; Hostetler, et al 2008; Knapp & Barrie, 1998; Knapp & Benton, 2005; Knapp & Yang, 2002; Knapp, 2006; Knopf, 1981; Liu & Kaplan, 2006; Lukas & Ross, 2005; Madin & Fenton, 2004; Morgan et al, 1997; Morgan et al, 2003; Orams, 1997; Porter & Howard, 2002; Powell & Ham, 2008; Powell et al, 2008, 2009; Ryan & Dewar, 1995; Tarlton & Ward, 2006; Tubb, 2003; Ward & Roggenbuck, 2003; Weiler & Smith, 2009;Wiles & Hall, 2005; Zeppel & Muloin, 2008
Attitudes	Adelman et al, 2004; Beaumont, 2001; Bright et al, 1993; Christensen et al, 2007; Cole et al, 1997; DiMauro & Dietz, 2001; Hostetler et al, 2008; Hughes & Morrison-Saunders, 2002, 2005; Knapp & Barrie, 1998; Knapp & Poff, 2001; Liu & Kaplan, 2006; Lukas & Ross, 2005; Morgan et al, 1997; Morgan et al, 2003; Orams, 1997; Povey & Rios, 2002; Powell & Ham, 2008; Powell et al, 2008, 2009; Tubb, 2003; Ward & Roggenbuck, 2003; Wiles & Hall, 2005; Zeppel & Muloin, 2008
Intentions	Ballantyne & Hughes, 2006; Hockett & Hall, 2007; Hwang et al, 2000; Lackey & Ham, 2003; Morgan et al, 2003; Oliver, 1985; Orams, 1997; Powell & Ham, 2008; Powell et al, 2008, 2009; Smith et al, 2008; Swanagan, 2000; Tubb, 2003; Weiler & Smith, 2009; Winter et al, 2000
Behavior	Adelman et al, 2000; Beaumont, 2001; Gramann, 2000; Hostetler et al, 2008; Knapp & Barrie, 1998; Orams, 1997; Powell & Ham, 2008; Randall & Rollins, 2009; Wallace & Gaudry, 2002; Ward & Roggenbuck, 2000, 2003; Winter et al, 1998; Winter, 2006

** For full references see Appendix B.*

The most common best practices (program characteristics) found in the articles were: Resource and Place-based messaging (53%) Actively Engaging the Audience (51%), Thematic Development (49%), Cognitive & Affective Messaging (49%), and Engaging Multiple Senses (MS) (47%). One limitation that should be noted is that we were reliant on authors' descriptions of the programs they evaluated to identify best practices. These authors may have only focused on a subset of program characteristics in their studies. This may have led to an under-identification of certain best practices.

Table 8: Summary of Best Practices

Program Characteristic	Total number of times program characteristic was present*	Percent‡
Theme development (TD)	34	49%
Link tangibles to intangibles (LI)	6	9%
Multisensory (MS)	33	47%
Actively engage audience (AE)	36	51%
Multiple activities (MU)	13	19%
Multiple delivery styles (MD)	33	8%
Relevance to audience (RA)	13	19%
Resource+place based (PB)	37	53%
Physically engage resource (PE)	28	40%
Tailored to audience (TA)	11	16%
Cognitive – fact based messaging (CM)	15	21%
Affective persuasive messaging (AM)	4	6%
Cog./Aff. Messaging (CAM)	34	49%
Benefits of action (BA)	24	34%
Social norms (SN)	21	30%
Ease of action (EA)	21	30%
Demonstrates action (DA)	3	4%

*Count exceeds 70 due to programs in articles employing more than 1 best practice
‡Percentage calculated on n=70

Best practices were linked to assessed outcomes a total of 394 times. Several papers evaluated more than one outcome, and most had multiple best practices linked to a single outcome. Table 9 lists how often each best practice was associated with an outcome and the number and percentage of times the best practice positively influenced this outcome. When examining the performance of each individual best practice, most were linked with predominantly positive outcomes at similar rates. Overall, the hypothesized best practices had a positive influence on outcomes in 84% of pairings (331/394).

When examining the relationship between outcomes and the group of best practices collectively, knowledge had the most pairings (n=169; 43%) and was positively influenced in 86% of pairings. Positive linkages were also noted in 86% of the 66 measurements of awareness. Satisfaction was positively influenced in 88% of 57 pairings; intentions were positive influenced in 100% of the 44 observed pairings; attitudes were positively influenced in 55% of 40 the observed pairings; and behavior was positively influenced in 67% of 18 the observed pairings.

Table 9: Occurrences of Best Practices Associated with Evaluated Outcomes and Percentage Associated with Positive Outcomes.

Best Practices	Satisfaction	Awareness	Knowledge	Attitudes	Intentions	Behaviors	Positive outcomes
Theme development (TD)	8/9 (89%)	4/5 (80%)	11/13 (85%)	3/5 (60%)	3/3 (100%)	0	29/35 (83%)
Link tangibles to intangibles (LI)	1/1 (100%)	4/4 (100%)	0	0/1 (0%)	0	0	5/6 (83%)
Multisensory (MS)	4/5 (80%)	7/9 (77%)	17/18 (95%)	2/4 (50%)	1/1 (100%)	0	31/37 (84%)
Actively engage audience (AE)	9/9 (100%)	4/5 (80%)	19/21 (90%)	2/4 (50%)	1/1 (100%)	1/1 (100%)	36/41 (88%)
Multiple activities (MU)	1/1 (100%)	4/4 (100%)	4/6 (66%)	1/2 (50%)	0	0	10/13 (77%)
Multiple delivery styles (MD)	4/5 (80%)	5/6 (83%)	12/14 (86%)	2/3 (66%)	4/4 (100%)	1/1 (100%)	28/33 (85%)
Relevance to audience (RA)	2/2 (100%)	2/2 (100%)	7/8 (88%)	1/2 (50%)	1/1 (100%)	0/1 (0%)	13/16 (81%)
Resource+place based messaging (PB)	5/5 (100%)	7/8 (88%)	13/16 (81%)	2/3 (66%)	5/5 (100%)	1/2 (50%)	33/39 (85%)
Physically engage resource (PE)	4/4 (100%)	2/3 (66%)	12/14 (86%)	2/4 (50%)	3/3 (100%)	0	23/28 (82%)
Tailored to audience (TA)	3/3 (100%)	2/2 (100%)	2/2 (100%)	2/3 (66%)	1/1 (100%)	0	10/11 (91%)
Cognitive – fact based messaging (CM)	3/3 (100%)	1/1 (100%)	10/13 (77%)	0	0	0	14/17 (82%)
Affective persuasive messaging (AM)	1/1 (100%)	1/1(100%)	2/2 (100%)	1/1(100%)	0	0	5/5 (100%)
Cognitive and affective messaging (CAM)	1/2 (50%)	5/7 (71%)	19/21 (90%)	1/2 (50%)	7/7 (100%)	2/3 (66%)	35/42 (83%)
Benefits of action (BA)	1/2 (50%)	3/3 (100%)	6/7 (86%)	2/3 (66%)	6/6 (100%)	3/4 (75%)	21/25 (84%)
Social norms (SN)	1/2 (50%)	3/3 (100%)	5/6 (83%)	0/1 (0%)	6/6 (100%)	3/4 (75%)	18/22 (82%)
Ease of action (EAM)	1/2 (50%)	3/3 (100%)	5/6 (83%)	1/2 (50%)	6/6 (100%)	1/2 (50%)	17/21 (81%)
Demonstrates action (DA)	1/1 (100%)	0	2/2 (100%)	0	0	0	3/3 (100%)
Total # and % of pairings with positive outcomes	50/57 (88%)	57/66 (86%)	146/169 (86%)	22/40 (55%)	44/44 (100%)	12/18 (67%)	331/394 (84%)

DISCUSSION

We identified the presence of best practices in 70 programs that were evaluated in peer reviewed literature and linked them to the reported outcomes of the programs. The findings presented in Table 9 indicate general support for each of the hypothesized best practices. Most interpretation programs utilized a combination of several best practices as evidenced by the number of pairings (394). This indicates that no one best practice in isolation is likely to be effective on its own. In other words, combinations of practices are likely necessary for successful programs. The results also demonstrate that some best practices were employed sparingly or were not described in the program descriptions. Thus, while each hypothesized best practice had similar percentages of positive linkages with outcomes, small sample sizes for particular pairings (best practice with specific outcomes) limit our ability to generalize about the relative effectiveness of many of the proposed best practices. The results also suggest that attitudes and behaviors are the most difficult outcomes to influence, which supports the notion that they are much more complex psychological constructs than satisfaction, awareness, and knowledge.

LIMITATIONS

When interpreting the results of this study, several limitations to our approach must be noted:

1. Most articles reported only positive findings, suggesting the possibility that negative or null results may be published less frequently.

2. We relied on authors' descriptions of the programs that they evaluated. Usually authors described the best practices being employed. However, authors' failure to describe the use of a particular best practice does not mean it was absent from the interpretive program. These authors may have only focused on a subset of program characteristics in their description. As such, we are more confident in our identification of the presence of described best practices and less confident in noting their absence. This may have led to an under-identification of certain best practices.

3. Small sample sizes for particular pairings (best practice with specific outcomes) limit our ability to generalize about the relative effectiveness of many of the proposed best practices.

CONCLUSION

Interpretation is a highly adaptable tool which may be used by resource managers to fulfill a variety of goals. It has been used to enhance visitors' enjoyment (e.g., Powell & Ham, 2008), develop awareness of park resources, increase knowledge (e.g., Powell, et. al., 2009), as well as influence behaviors such as decrease vandalism (e.g., Ward, 2003), minimize resource impact (e.g., Marion, 2007), and foster adoption of long-term pro-environmental behaviors (e.g., Wallace & Gaudry, 2002).

The purpose of this study was to review a body of literature to identify consensus-based best practices for interpretation and to examine the empirical evidence supporting those best practices (i.e., explicitly link them to outcomes desired by the NPS). Understanding these linkages would provide a powerful tool for testing widely held assumptions, isolating potential indicators of program quality, and subsequently refining interpretation practices.

The results of our review of seminal works indicate that there is a relatively consistent list of recommended best practices. Our review of peer reviewed literature to investigate the linkage between these best practices and desired outcomes suggest that there is broad support for all of these practices. However, the review of peer reviewed articles also suggests that this support is only circumstantial because these practices were rarely isolated and explicitly tested.

Understanding how to bridge this gap will be an important function of interpretive research in the 21st century (Knapp & Benton, 2004). Future research needs to undertake multi program comparisons in an attempt to isolate specific practices or groups of practices and their link to particular outcomes. In so doing, researchers can provide empirically supported and useful benchmarks for delivering successful interpretation.

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