

Evaluation Brief EB5

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Avoiding Cognitive Overload and Fatigue

Although exhibit development teams want visitors to learn as much as possible from their exhibits, a well researched, general rule when designing interpretation for casual learners is to minimize cognitive overload. The basic rule is this: When visitors are presented with too much information, they wind up learning less, not more.

National Park studies have shown us that most people who visit the Grand Canyon, do so primarily because they want to see the Canyon, not because they want to learn geology. That's not to say that they don't welcome the opportunity to learn about geology, or that they don't appreciate that the Grand Canyon is an area rich in geological features. In fact, many of them come with the expectation that they **will** learn something about geology. Their primary motivation for being there however, is to see the awesome spectacle before them. This is important to remember because in the majority of cases, any learning about geology that takes place is achieved while visitors are engaged in at least one other primary activity (seeing the Canyon) and usually a secondary activity (social time with family and friends). Learning, if it's on the agenda at all, is often (usually?) only third in line. This means that learning has to be immediate, satisfying, and easily attained.

Given that most visitors have only a secondary or even tertiary interest in the geology of the canyon, the argument of having extra information *for those who might want it* is a common one. Unfortunately all too often it actually ends up being counter-productive to the achievement of informal learning. If it was just a matter of visitors ignoring what they don't want, that'd be one thing. Rather, many visitors try to be "good" and assume that if the information is there, it must be important; and they will work very hard at trying to take it all in. This quickly results in cognitive overload, the outcome of which is that visitors then stop paying attention to any interpretation at all. We also know that visitors often have trouble sorting through all the information and finding what they want or need. They often wind up focusing on bits of information haphazardly, rather than developing an overall understanding of an exhibition's theme.

Most of the research data to support this premise is in the form of unpublished evaluation studies on specific exhibits and exhibitions. However, some researchers have published similar findings based on more formal studies.

Cognitive overload is a huge problem in museums of all kinds (e.g., Evans, 1995; Hedge, 1995).... Adults wanting to support their children must make sense of each novel device, decipher the instructions, guide their children toward the key experience, interpret this experience for themselves, translate the significance of it for their children, assess the result, and make on-the-fly adjustments as needed to optimize their children's learning. Over and over, every few minutes, adults coach their children in technical and cognitive skill-building without previous training. The effort it takes to negotiate a museum is apparent through the common phenomenon of "museum fatigue," in which visitors can only engage deeply with exhibits for a limited period (typically about 30 minutes) before they lose their focused attention and begin to "cruise," looking for anything particularly compelling before moving on (Falk, Koran, Dierking & Dreblow, 1985). Museum fatigue is an important factor that limits the degree to which visitors can effectively learn any form of science. [Sue Allen's *Designs for Learning*]

While Allen was referring specifically to hands-on science museums, cognitive fatigue is a more general phenomenon observed in all kinds of informal learning settings. It may in fact be even more pronounced at the south rim specifically because learning is even less of an agenda for Grand Canyon visitors than for science museum visitors. The question is not whether or not to have something extra for those visitors who might want it, but rather how to get most visitors to want to focus on the appropriate interpretative materials in the first place.

Loading up the interpretation with extraneous *might-be-nice-to-have* information will not make visitors want to read it, and will in fact do the opposite.

Cognitive fatigue occurs whenever a person uses mental effort to sustain attention....When cognitive fatigue occurs, it becomes extremely difficult to learn. One cannot pay attention, indeed, one typically is not motivated to engage in any higher order mental process. Under such conditions an individual is easily distracted and often irritable (Kaplan, Bardwell, and Slakter, 1993). Although cognitive fatigue may co-occur with physical tiring or exhaustion, it is a distinct process brought about by sustained cognitive activities characterized by the expenditure of voluntary effort or directed attention.

The physical environment can influence cognitive fatigue in at least two ways. Setting characteristics can heighten cognitive fatigue when they are illegible or difficult to comprehend, to read, and to understand (Lynch, 1960). Efforts to find one's way in an incoherent space or to make sense out of ambiguous or misleading cues about the meaning or function of objects contribute to cognitive fatigue. (p. 119). [Evans (1995), *Learning and the Physical Environment*.]

Consider that visitors to the Grand Canyon are in an unfamiliar environment, a little bit apprehensive, often worried about their own and their visiting companions' safety and well-being, and distracted by the spectacular grandeur surrounding them. Add to that the fact that with the *Trail of Time* we are also asking them to place themselves conceptually along a horizontal timeline, relate that to unfamiliar vertical striations of the Canyon itself, and begin to develop a sense of the complex construct known as *deep time*. It is not surprising that cognitive fatigue will come quickly to most visitors.

Recommendations:

1. Develop clear and reasonable goals for what casual visitors should take away from their experience with the *Trail of Time*. Be vigilant about making sure that every piece of information that is part of each interpretive component is part of the Big Idea and will help achieve the goals and objectives.
2. Clearly communicate information using a variety of media (signage, guides, pdas) so as to communicate with visitors who have different learning preferences.
3. Resist the temptation to add information that is extraneous to the stated goals and objectives *in case someone might want it*. Remember that in this case, less is more.

References

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