Visitor Conceptions of Science Before and After Visiting Exhibits

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The purpose of this study was to investigate the impact of a museum visit on preconceived notions of scientific explanation. Our hypothesis was that many naive preconceptions or notions are difficult to change even when people are exposed to correct information.

Methods

The participants consisted of three groups of 20 randomly selected visitors (31 males and 29 females) whose education levels varied from 8th grade to the Ph. D. level. Ages ranged from 13 to 56 and all were residents of Wisconsin.

Visitors were given a paper-and-pencil survey comprised of one of three basic, open-ended questions relating to the specific science concepts explained in the exhibits: "How were the Rocky Mountains formed?"; "How are glaciers formed?"; and "Why are some insects brightly colored?". After responding to the survey question, the visitors were then asked to view the exhibits. Following visits to the exhibits, subjects were given the opportunity to change or modify their previous response.

Results

"How were the Rocky Mountains formed?"

As shown in Table 1, glaciers and earth movements (other than earthquakes) were found to be the most popular preconceptions, followed by earthquakes, volcanoes, erosion, evaporation and then various other responses. These responses show no significant change even after viewing the exhibits. As one can see, most of their preconceptions were retained.

Table 1
How were the Rocky Mountains formed? (N=20)

Response	Pre-visit	Post-visit
Glaciers	45%	35%
Earth Movements	35%	50%
Earthquakes	25%	25%
Volcanoes	25%	25%
Erosion	15%	15%
Evaporation of water	5%	0%
Other	10%	10%

"How are glaciers formed?"

Similarly shown in Table 2, freezing rain and moving sheets of ice were the most noted preconceptions for this science concept. Climate changes, existing bodies of water, snow compression and various other responses followed respectively. Here too, we can see the change in response after viewing the exhibits were negligible.

Table 2
How are glaciers formed? (N=20)

Response	Pre-visit	Post-visit
Freezing rain turns to ice	45%	45%
Moving sheets of ice	25%	30%
Climate changes	20%	20%
Existing Bodies of water freeze	20%	20%
Various responses	20%	10%
Snow compression	5%	15%

"Why are some insects brightly colored?"

Table 3 shows camouflage and mating to be the most frequently reported responses followed by self-protection, protection of territory, warning predators and warding off predators. Once again it is evident that there was little change in responses as a result of viewing the exhibit.

Table 3
Why are some insects brightly colored? (N=20)

Response	Pre-visit	Post-visit
Camouflage	75%	60%
Mating	35%	50%
Self-protection	20%	20%
Protection of Territory	15%	20%
Warn predators	10%	20%
Ward off predators	5%	5%

Discussion

"A common misconception about misconceptions is that they are held by children and replaced through formal instruction, but there are indications that naive notions are widespread among adults."
Minda Borun (1989)

The results of the current study strongly support the above statement by Borun. For all three exhibits, visitors preconceptions were unlikely to change as a result of viewing the

exhibit. It is unclear whether the lack of change in preconceptions was due to the resistance of visitors to change their beliefs or to the failure of the exhibits to communicate their message. Formative evaluation of labels (e.g., Screven, 1988) might determine if the exhibits are capable of teaching the scientific information involved in this study.

Results of this study are consistent with others (e.g., Borun, 1989; Clement, 1989; McClosky, 1982; Nussbaum, 1979) in demonstrating that people do not approach exhibits with a "blank slate" ready to be written on. Preconceptions may have a significant impact on visitors' experience. In the current study visitors were "primed" to look for the correct answer in the exhibit by the pre-visit treatment. Despite such "priming" visitors rarely changed their responses following their visit to the exhibit.

References

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Note

This article is a summary of a research project completed for course credit under the direction of C. G. Screven.

ASTC Publishes Articles in "What Research Says" Series

Do people read exhibit labels? Is front-end evaluation worthwhile? These are some of the questions explored in the ASTC series, "What Research Says about Learning in Science Museums." The first ten articals in the series, which is a regular feature in the ASTC Newsletter, have been published as a single, softbound, 38-page illustrated volume with an introduction by Beverly Serrell, coordinating editor of the series. Providing information on research applicable to museum settings and ample resources and references for further reading, these concise articles are invaluable to museum professionals and others in the field of informal education.

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