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Brazilian visitors' motivation to a museum: psychometric properties of an instrument through combination of methods

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LINECIN

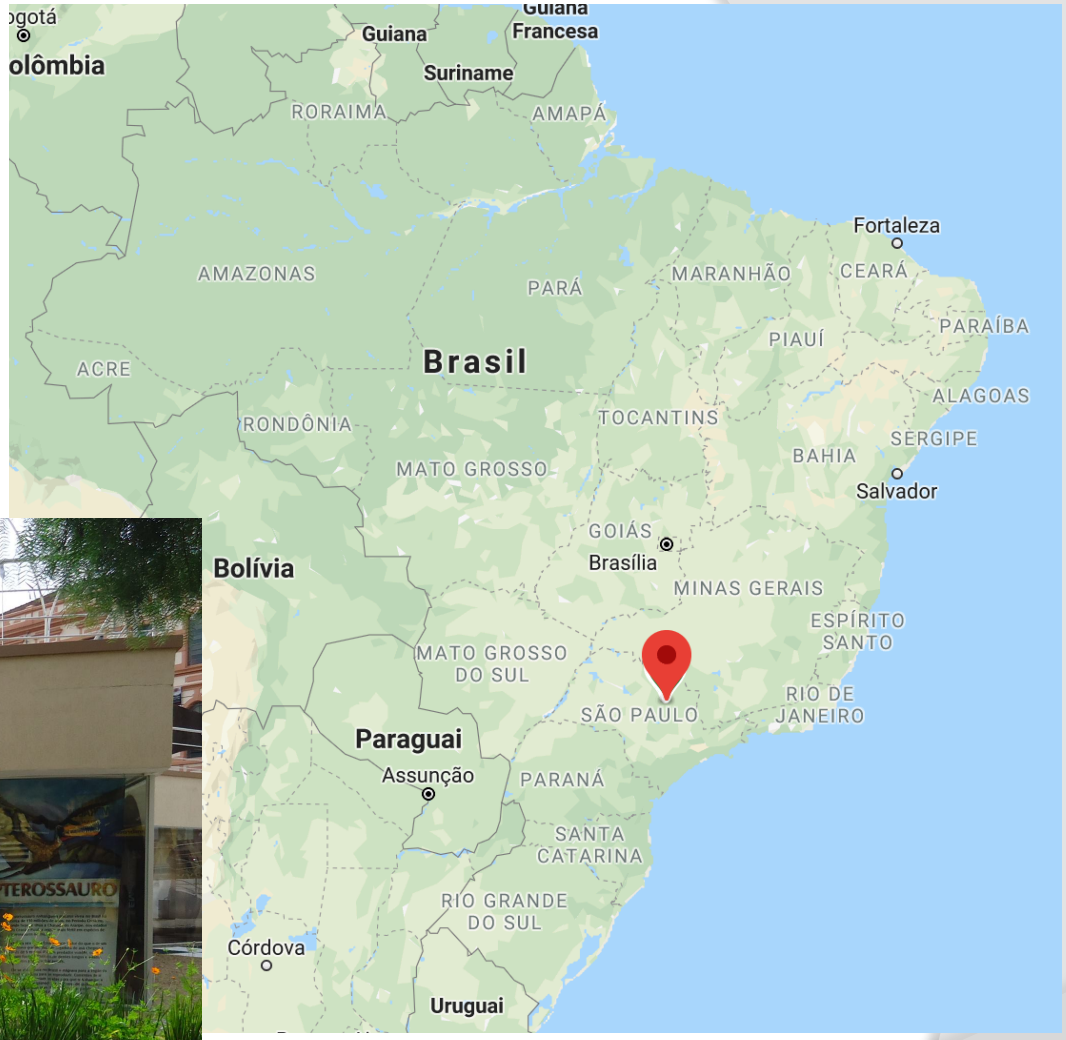
- 268 science centers registered
- 58% are concentrated in the southeast region
- 96% of Brazilian people have never visited a museum

Why do Brazilians go to science museums?

Associação Brasileira de Centros e Museus de Ciência. **Centros e museus de ciência do Brasil 2015**. Rio de Janeiro: UFRJ. FCC. Casa da Ciência; Fiocruz. Museu da Vida, 2015. Retrieved from http://www.mcti.gov.br/documents/10179/472850/Centros+e+Museus+de+Ci%C3%AAncia+do+Brasil+2015+-+pdf/667a12b2-b8c0-4a37-98f5-1cbf51575e63. Accessed April 10, 2016.

Methods

- ✓ Science Museum "Professor Mário Tolentino";
- ✓ located in the city of São Carlos, SP, Brazil



Google Maps
https://www.facebook.com/MuseuDaCienciaDeSaoCarlosProfMarioTolentino/

Methods

- ✓ Validation of the instrument for evaluating the motivation for a museum visit developed by Delgado (2008);
- ✓ 202 usable surveys were collected from visitors of minimum age 15 years;
- ✓ Data were collected on-site immediately before visitors entered the exhibition;

Delgado, M. F. S. (2008). Constrangimentos às visitas aos centros de ciência: o caso do Pavilhão do Conhecimento (Masters dissertation, Universidade de Aveiro, Aveiro, Portugal). Retrieved from http://hdl.handle.net/10773/1623.

Methods

Participants:

- ✓ Largest groups of respondents:
  - ✓ Visiting the museum for the first time (n = 105; 51.98%);
  - ✓ Females (n = 125; 61.88 %);
  - ✓ Students (n = 168; 83.17 %);
- ✓ Ages:
  - ✓ 154 (76.24 %) between 15 and 24 years;
  - ✓ 23 (11.39 %) between 25 and 34 years;
  - ✓ 16 (7.92 %) between 35 and 44 years;
  - ✓ 6 (2.97 %) between 45 and 54 years;
  - ✓ 2 (0.99 %) between 55 and 64 years;
  - ✓ 1 (0.50 %) was aged 65 years or more.

Methods

The questionnaire:

- ✓ Part A
  - ✓ nine questions of personal information such as level of schooling and occupation;

- ✓ Part B (Delgado, 2008)
  - ✓ Five-point agreement Likert-type scale;
  - ✓ Initially contained 20 items divided between five hypothetical dimensions:
    - ✓ Leisure and entertainment motivation (five items);
    - ✓ Discover news motivation (four items);
    - ✓ Learning motivation (five items);
    - ✓ Interaction motivation (four items);
    - ✓ Participation in museum activities motivation (two items).

Methods

The analysis:

- ✓ First step
  - ✓ Exploratory factor analysis (EFA):
  - ✓ Investigation of the reliability of the questionnaire by calculating Cronbach's alpha coefficient;
  - ✓ Correlation among the data was evaluated using Bartlett's sphericity test and the Kaiser-Meyer-Olkin (KMO) statistic;
  - ✓ Principal component analysis to calculate eigenvalues of the data correlation matrix.

- ✓ Second step
  - ✓ Comparative analysis using the Information Bottleneck (B) cluster method;

- ✓ Statistical Program for the Social Sciences (SPSS) and MatLab software package.

Results and Discussions

- ✓ KMO measure: 0.87
- ✓ Bartlett's sphericity: $\chi 2$ value of 1620.122 (df = 190, p < 0,001)

** Applicability of factor analysis (Hair et al., 2006) **

- ✓ Cronbach's alpha coefficient: 0.87 → high level of reliability

Hair, J. F., Black, B., Babin, B., Anderson, R. E., & Tatham, R. L. (2006). Multivariate data analysis (6th ed.). Upper Saddle River, NJ: Pearson Education.

Results and Discussions

EFA:

- ✓ Four eigenvalues greater than 1 that explained 57.76 % of data variance;
- ✓ Four factors with eigenvalues greater than 1 were founded.

- ❖ Factor 4 presented a very low alpha coefficient (0.42) → items 2, 7 and 8 eliminated;
- ❖ Performing EFA again:
  - ❖ Three remained factors with eigenvalues greater than one;
  - ❖ All loadings per factor were greater than 0.4 (Table 1) and the recommendation of a sample size of at least 200 individuals was satisfied (Hair et al., 2006).

Table 1. Factor Loadings Associated with the Motivation for Visiting Questionnaire

Item Number	Item Description	Factor Loading [a]
Factor 1: Discovery News and Learning Motivation		
1	Discovery news	0.75
3	Having an opportunity to learn	0.74
4	Participating in the museum's activities	0.54
5	Entertainment	0.59
6	Satisfying my curiosity	0.75
8	Increasing my knowledge about science and that of my family/friends	0.57
10	Being challenged and having new experiences	0.62
13	Participating in museum activities to have an opportunity to interact with the experiments and to learn more	0.59
15	Satisfying my curiosity about science	0.75
17	Increasing my knowledge and that of my family/friends	0.58
20	Having an opportunity to learn science	0.80
Factor 2: Interaction Motivation		
11	Feeling that people will see me in another way	0.66
12	Getting personal and professional skills	0.56
16	Being with people	0.59
19	Interacting with people	0.71
Factor 3: Leisure Motivation		
9	Breaking the routine	0.83
14	Resting	0.74
18	“Killing” time	0.76

Note: It was assumed that eigenvalues should be greater than 1 according to the Kaiser-Guttman criterion (Guttman, 1954; Kaiser, 1960).

Results and Discussions

- ✓ Factor 1: most important of the three factors because it explained 35.18 % of the total of variation in the responses;

Discovery news and Learning motivation:
Visitors perceived the science museum to be a setting that could best satisfy their educational interest

Results and Discussions

- ✓ To incorporate learning opportunities into an exhibition, activities that allow controlled choice are more suitable because they encourage effective and more complex learning (Bamberger & Tal, 2007; Griffin, 2004);

- ✓ Museum programs can stimulate teachers in the planning and management of school excursions by linking the topics being studied at school with those at the museum (Griffin & Symington, 1997).

Bamberger, Y., & Tal, T. (2007). Learning in a personal context: Levels of choice in a free choice learning environment in science and natural history museums. Science Education, 91(1), 75-95.

Griffin, J. (2004). Research on students and museums: Looking more closely at the students in school groups. Science Education, 88(Suppl.1), S59-S70.

Griffin, J., & Symington, D. (1997). Moving from task-oriented to learning-oriented strategies on school excursions to museums. Science Education, 81(6), 763-779.

Results and Discussions

- ✓ Factor 2:
  - ✓ Explained 12.01 % of the total variation in the responses;
  - ✓ Label Interaction motivation
  - +
  - ✓ Item 12 (learning);

- ✓ Factor 3:
  - ✓ 8.04 % of the total variation in responses;
  - ✓ Leisure motivation.

Results and Discussions

IB

- ✓ T = 1: all of the data was compressed into one cluster;
- ✓ T = 2: two clusters (T1 and T2)
  - ✓ Cluster T2 contained the same items as EFA factor 3 (Leisure motivation), namely 9, 14 and 18;
- ✓ T = 3:
  - ✓ Cluster T2 remained unchanged;
  - ✓ Cluster T1 was split into two:
    - ✓ EFA factor 1 (Discovery news and Learning motivation) + item 12;
    - ✓ EFA factor 2 (Interaction motivation).
- ✓ IB with item 12 omitted: same item structure.

Conclusions

- ✓ EFA and IB can be used as complementary methods to modify the tool and provide insights into visitor motivation;
- ✓ Seeking opportunities to learn and to interact with other persons are two significant motivations to visit, and these have to be satisfied by the science museum studied;
- ✓ Such studies are under-represented in the Brazilian perspective and the results of this type of survey enrich our understanding of the cultural diversity of museum contexts.

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