Science and literature travelling together in metropolitan buses

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Abstract

Science For All is a partnership with a literature award-wining project "Reading for all", which has been bringing fragments of literature and poetry for bus users in the city of Belo Horizonte, Brazil, for over nine years. Since 2011, bus users also have access to science texts displayed on laminated A4 sheets hung on the back of 18 seats. Biology predominates in the themes of the texts, but chemistry and physics are also present. Changed every three months, the texts can reach over 17 million potential readers per year. We present here the analysis of data collected during three years among bus users on their perception of the science texts available throughout this period. Semi-structured in character, the questionnaire open-ended questions invited users to lay out their general comments and suggestions of topics for later publication. Demographic outline of the public, reception context of the project, and questions on the perception of science in mainstream media are some of the researched items. Our data suggest that the initiative is reaching a public that otherwise would not have access to science information, especially that generated from research in a public university. The study also points out for the success of the combination of science and literature in this unusual mode of mass media communication made available inside public transportation.

Introduction

"Reading for all" is a project that has been bringing fragments of literature and poetry for bus users in the city of Belo Horizonte, Brazil, for over nine years. Science content has been introduced in the form of text through the project "Science For All" in 2011. Bus users have access to texts displayed on laminated A4 sheets hung on the back of 18 seats in about 10% of the metropolitan bus fleet of Belo Horizonte, Brazil. The project "Reading For All" won a Brazilian national prize on Incentive for Reading (Viva Leitura) in 2007, and has had an impact in increasing reading levels in the city (Inácio et al. 2007). The city offers bus services to 37,986,892 passengers per month (BHTrans Balanço de Mobilidade, 2011) a very high number of potential readers, even tough the project reaches less than 10% of the fleet. The aim of "Science For All" is to increase science awareness for a population that have no or few access to this type of content using the bus as a mass media.

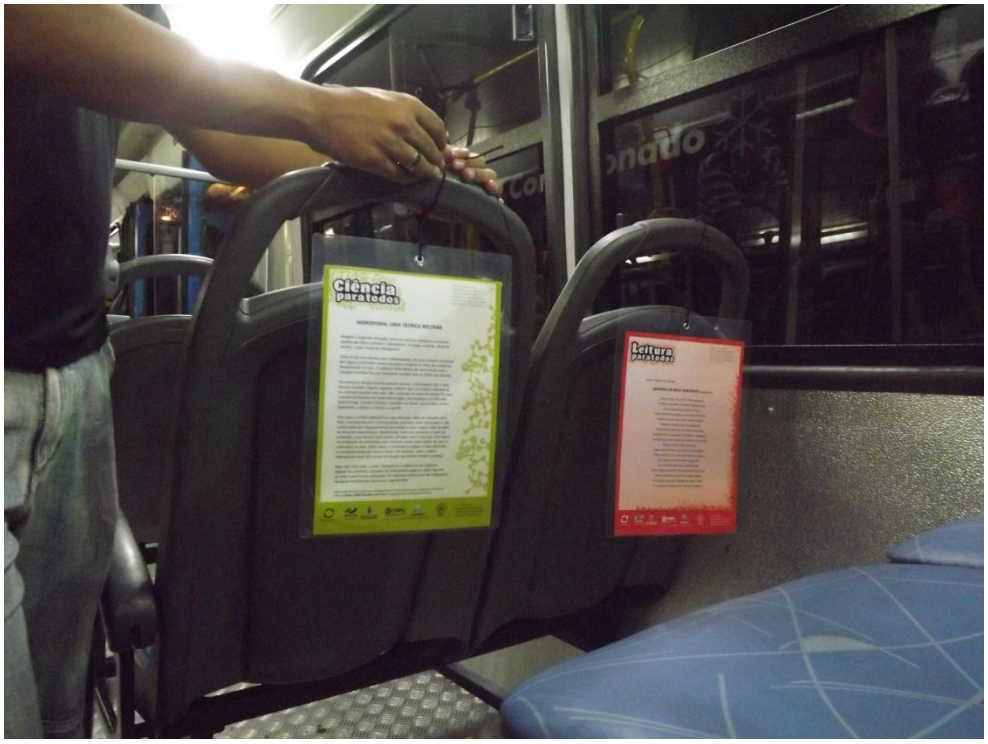

Figure 1 – Positioning of laminated sheets on the back of bus seats. Science texts are printed on the back of literature texts.

In an empirical study in the San Francisco Bay area, Mokhtarian and Salomon (2001), reported that half of the 1,900 respondents did not agree that travel time is generally wasted time. It is certain that culture of a society will profoundly influence in the repertoire of possible activities during that journey to make it more pleasant. According to Gamberini et al. (2013), "the repertoire of activities performed during a journey are more than a way to use the time available during travel; they are a statement that defines who passengers are and how they want other people to relate to them". Although we do not have access to research on travel behavior of bus users in the city of Belo Horizonte, our personal experience indicates that book reading is far from being the most common activity. Staring out of a window or sleeping are two common passive activities. A substantial part of the activities repertoire now is related to the use of mobile Information and Communication Technologies (ICTs), which was not a reality in Brazil in 2003, when the "Reading For All" project started. In this scenario, the introduction of the texts in the bus represented an important offer of reading for the population that did not have access to classical and contemporary literature in the form of books or magazines.

Wrapped-up in a very unconventional media, scientific texts are brought forth to new contexts of reception in public transportation and, similarly, foster new modes of media consumption. By outlining the profile of bus users and the overall level of understanding of the texts, our research has assessed some indicators – such as age, education level and spontaneous text recovery - that allow us to estimate how popular scientific knowledge has become by means of these texts. We conclude that low rates of formal educational are, by no means, an insurmountable challenge to science popularization and that science can also be appropriated by means of easy-understanding readings.

Methodology

This study represents an initial analysis of the data collected from 2011 to 2013 among metropolitan bus users in the city of Belo Horizonte, Brazil. The research was conducted through interviews by university students that participated of the project. Interviews were done with 587 respondents and were mostly done off-peak in the

afternoons due to working hours of the students. Interviewers invited bus users to answer a semi-structured questionnaire with 14 closed-ended questions and two open-ended questions. The first four questions referred to demographic data, i.e. gender, age, education level and frequency of bus usage. The next seven questions were related to knowledge about the project, frequency and level of interest in the texts, and indication of preferred style (poetry, stories or science). The final question of this block was related to level of understanding of the science texts. The last three direct questions aimed at understanding the usage of media such as TV, radio and newspapers and internet by the respondents. Two final questions opened the possibility for the respondent to make comments, suggestions and indicate science themes he/she would like to read in the buses. Data were organized using the Microsoft Excel package and were analyzed using the GNU PSPP free software.

Results

The texts of the Reading and Science For all projects are read very frequently or occasionally by 79% of the bus users interviewed. Overall, there was a predominance of female (62%) over male respondents (38%) and this cannot be due to demographic data of the city, which is only slightly skewed towards the female gender (53.1%) (IBGE, 2010). This could be due either to working hours of the students, mostly in the afternoons in off-peak periods, or a gender bias. The most frequent class among respondents was of women between 16 and 24 years of age (17.2%), followed by men in the same age range (14.9%). Sixty-seven percent of the sample were under 40 years of age.

Education level data is very relevant considering the aim of the project. First, self-declared illiterates were only 0.4% and were all above 50 years-old. On the opposite side, 80% of the respondents declared to have high school or university degrees. In this class there is a prevalence of young people. Among youth between 16 to 24 years-old, 89.8% had at least high school degree. This is similar (93%) in the age group just above (25-29 years of age). Among the class of users above 50 years-old we found the lowest level of university education (6.7%), and also the highest frequency of elementary school level (63.6%).

However, despite the prevalence of users with high schooling we can say that the texts of science were well accepted in all classes, even among those with lower levels of education. Interestingly, 49.4% of users that studied up to the 8th grade of elementary school declared having understood science texts very well. A high level of understanding was also reported by 38.1% of those who studied until the 4th grade, a rate higher than that for users who did not read the texts (28.6%). This overall acceptance could be seen as one out of many possible indicators of science popularization we have come to grips with.

In terms of media consumption habits, about 22% of all users were reported to watch science programs on TV very frequently, a number very close to the Brazilian national survey of 2010 (Ministério da Ciência e Tecnologia, 2010). As for radio programs on science, respondents of all educational levels declared to listen rarely or never to radio programs on science (86.4%). Nationally, only 5% of the surveyed sample declared to listen to radio programs on science very frequently. A very significant part of the interviewees who answered having understood the texts very well declared that never or rarely watch science programs on TV (19.3%). This number was only higher in the group that declared to watch TV programs occasionally (30%). Conversely, most users (69.2%) get informed about science content in newspapers, internet, magazines or books although the public for this media is mostly among high school and university degree holders (59.6%).

We have collected qualitative data, but answer to these questions was not mandatory. They were an open space for comments, suggestion of themes and an opportunity to cite a text that they have read on the bus. About 28% of the respondents made comments on the project, mostly encouragement words and congratulations on the initiative. We considered high the number of respondents who suggested themes they wanted to read on the bus (44.6%). The indications were either very general, such as environment and health, or very specific, such as robotics and the big bang theory. When asked to recall a text, 33% were able to remember the main theme or even the title of a text. This number was close to the earlier survey of the “Reading for All” literary project – 37% (Kaizer et al., 2008). In one open-ended question, readers declared a slightly higher preference for poetry and prose (45%) than for science texts (35%). However, to

our surprise, scientific texts themes were mentioned more often (145 times) than literature-related themes (64 times). The terms that respondents spontaneously used to refer to scientific texts were sometimes so detailed and specific that we dare to state that the level of text recovery was also higher for scientific texts (in literature texts, for instance, some only indicated a more general name such as poetry). The total number of themes associated to scientific texts was also greater than that related to literature texts: 64 themes and 24 themes, respectively.

Figure 2 represents the most frequently recovered science themes or titles. Mentioned 11 times, "Chatting Cows" refers to a series of four texts transcribed from a homonymous radio program. Some of the interviewees quoted the title of the text as such, while others rather employed terms that had some kind of relationship with the title, such as "cows talking about stars". Others, however, employed terms that were closely related to the scientific processes, such as "humidity" or "plastic bottle". Conversely, the most cited term referring to literature was "poetry", which is extremely general as a category. In other words, it seems that the semantic cloud associated to the scientific texts was thicker than that of the literature texts.

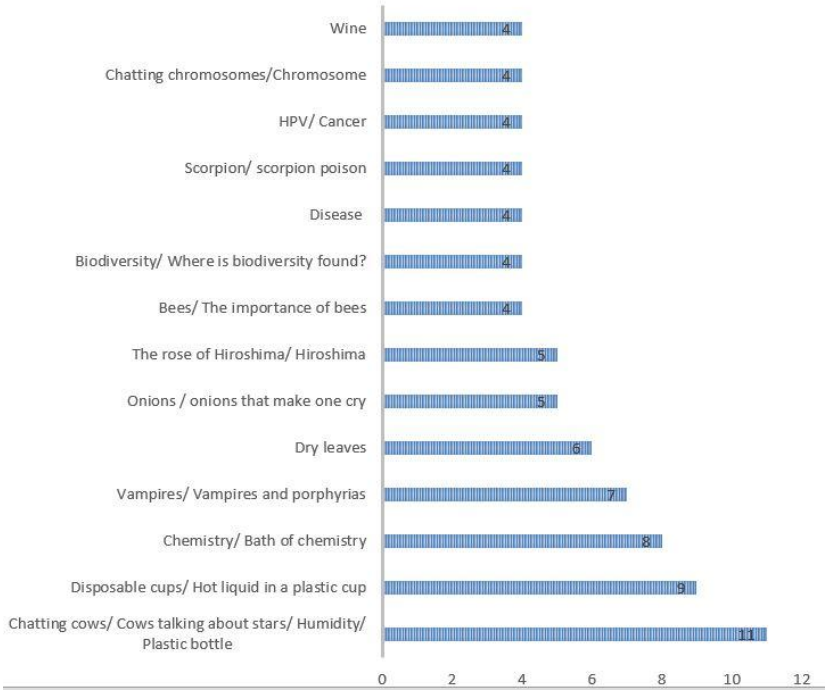

Figure 2 – Frequency of science titles/themes recovered from 145 respondents. Themes cited less than four times were omitted.

Discussion and Conclusion

The Project "Reading for All" was conceived in 2003 in line with Pierre Lévy's concept of collective intelligence (Kaizer et al. 2008). Each individual intelligence must act around a linking object, a catalyst of collective intelligence. The laminated sheets with the texts distributed in the buses would serve as the link-object mentioned by the philosopher in the sense that they are manipulated, read, re-read, subjected to comments and memorized by thousands of bus users without being appropriated by a single individual or linked exclusively to a personal identity. The same conception relates well with our idea of social inclusion and science popularization. Our data indicates that science, presented in the form of the laminated sheet and text, can become part of a collective intelligence in which the themes and contents are shared and new ideas are developed from that point on.

In 2008, when "Reading For All" was in its 5th year, surveys showed that 70% of interviewed users knew about the project and 37% of them could recall a text. More importantly, some comments of readers showed that the project created a unique opportunity for them, such as a 21 year-old respondent who said: " I don´t like to read, but I read here on the bus, because the project brings the reading to me" (Kaizer et al., 2008). Similarly, "Science For All" aims to share scientific knowledge with this public bringing science to the user of public transportation.

Overall, scientific texts displayed in buses are read and well understood, despite important cleavage in education levels. Although the education level is high in the sampled population (80% had at least a high school degree) we are very interested in the least educated class. To our contentment, good understanding of science texts was reported by respondents that had only the 4th (38.1%) or 8th grade (49.4%) in which there are more people over 50 years of age. The recovery rate of 33% for scientific texts is particularly remarkable, if one considers the fact that 19.3% of those who answered having understood the texts very well declared that never or rarely watch science programs on TV. Moreover, scientific texts were recovered in a more-detailed manner, showing that science made a good imprinting on the readers' memory.

We are confident that the texts in the buses are already part of the dynamics and history of public transportation users in the city of Belo Horizonte and that reading is part

of the repertoire of activities user are engaged with during long or short travels. We also trust from our data that science is reaching a public that would not otherwise have a chance to get in touch with scientific subjects, especially those generated by researchers from a public University. Thus, borrowing Pierre Lévy's idea for the conception of "Reading for All" (Kaizer et al., 2008), science gains its space in the construction of a collective intelligence using the laminated sheet as the object-link for the bus rider and reader.

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