

**Opinions, interests and attitudes of young Brazilian in face of science:
an evaluation in nationwide**

Ana Maria Santos Gouw

Faculty of Education and Research Nucleus on Education, Divulcation and
Epistemology of Evolution “EDEVO - Darwin” – São Paulo University
anagouw@usp.br

Nelio Bizzo

Faculty of Education and Research Nucleus on Education, Propagation and
Epistemology of Evolution “EDEVO - Darwin” – São Paulo University
bizzo@usp.br

Abstract

The disenchantment of students in science education and the career in science has led to a movement in the academic field in favor of listening to what students have to say about their science classes and its position against several issues related to science and technology. One of these movements is the project The Relevance of Science Education (ROSE). The research, which is essentially quantitative, lies within the field of educational assessment and, as a tool for data collection, a closed questionnaire with 245 items whose answers are expressed in a Likert scale of 4 points is used. In all, 2365 students, from 84 schools, took part in the survey,. The data reveals that the Brazilian, in general, have great interest in the scientific topics covered in school. Among these, those which arouse their interest are the ones related to the human body. In relation to science school, the young Brazilians consider the discipline interesting, although not having preference for it over other disciplines. There is a positive relation to the general subject, both with respect to its importance as to its usefulness. We also observed that young Brazilians have a generally optimistic attitude towards science and technology.

Key words: relevance of science education, interest of youngsters in science, educational evaluation

Introduction

It has been noted in several countries around the globe, a general disinterest of young people towards school science, which has unleashed a low entry, by students, in scientific careers (Aikenhead, 2004, European Commission, 2004, 2007, Fensham, 2004, Jenkins, 2006, Jenkins y Nelson, 2005, Osborne, Simon y Collins, 2003, Osborne, 2006, Osborne y Dillon, 2008, Shamos y Howes, 1996, Tomei, 2008, Schreiner y Sjøberg, 2004, Vázquez Alonso y Manassero Mas, 2008).

Anthony Tomei (2008) comments on this aspect, that there are deficiencies observed in pedagogy, curriculum and assessments, but the deeper problem lies within the fact that school science has never provided a satisfactory education for the majority, which has generated implications adverse to the training of future scientists.

If there are problems in science education, as the low proficiency observed among young Brazilians, and little interest, what do students themselves have to say about this fact? This survey polled 2365 young people from all Brazilian states, in order to know their preferences and the scientific topics of their greatest interest that are present in the Brazilian school curriculum.

For such, was implemented the international project The Relevance of Science Education (ROSE), developed by researchers at the University of Oslo, which aims to investigate the relevance of scientific and technological knowledge for young people who are finishing compulsory education (about 15 years was implemented age). The project has been adapted collaboratively by many researchers around the world and its data collection instrument - a questionnaire enclosed with 245 items - has already been applied in over 40 countries (Schreiner y Sjøberg, 2004).

The researchers involved in project ROSE agree with the fact that science curriculum should address the needs of students, consider what they consider relevant, in order that student's voice and vision should influence the curriculum developers and their implementation in schools (Anderson, 2006; Cavas, Cavas, Tekkaya, Cakiroglu y

Kesercioglu, 2009; Jenkins, 2006; Jidesjö, Oscarsson, y Karlsson, 2009; Matthews, 2007; Schreiner y Sjøberg, 2004; Vázquez Alonso y Manassero Mas, 2008).

One solution to cope with the low interest of young people across science education is indicated by Deboer (2000): the need to decide what to teach and how to teach based on student's interest in teachers' experience, and local contexts. The goal should not to be to provide students high grades in international tests, but to graduate students who consider science interesting and important, directed to their own lives and able to participate in conversations about science taking place in society.

Fourez (2003, p 110) points out that the crisis in science education, reflected in low student enrollment in scientific careers is due largely to a school science that does not promote the interests of students, "students would have the impression that are forced to see the world through the eyes of scientists. While, what would make sense for them should be a science education that would help them understand the world."

The problem involving low-income of young people into scientific careers was presented in detail in the report Europe Needs More Scientists (European Commission, 2004). The document highlights the concern with the fact that among the 25 European Union member countries, only Greece and Belgium (Flamenca part) there cannot be observed a decrease in the number of young people choosing to study science in schools.

In the Latin American context this has also been observed, which has made the Iberoamerican Observatory of Science, Technology and Society, affiliated with the Organization of Ibero-American States (OEI), delineate as one of the 2021 Educational Goals the need to encourage young students to scientific and technological careers, stating that by the year 2015 there is a 10% increase in the proportion of young people who pursue such careers (OEI, 2013; Polino y Chiappe, 2011)

However, there is consensus oriented to the fact that all teaching should be built based on the child's interests and experiences. For teaching contents to be meaningful for the student, they need to have some sort of relevance and also fit the student's personal and social context (Sjøberg, 2000).

Jenkins (2006) suggests, as untested hypothesis, that the more one knows about the interests, enthusiasms, beliefs and attitudes of students, more feasible it will be to

develop a curriculum in science that engages students and helps them to reduce differences with regard to their academic choices.

Thus, with regard to science education, the need to listen to students becomes imperative when faced with the fact that young people are increasingly less interested in formal school science. Baram-Tsabari and Yarden (2005) point to the importance of listening to the student's voice in curriculum construction and reforms in the science courses, so that they become more interesting and attractive to students.

Thus, this paper presents data from the application of the Rose Project in Brazil that sought to contemplate the following questions: a) what are the themes of school science that mostly interest young Brazilians; b) what are the attitudes of Brazilian youngsters towards school science and c) how do young Brazilians regard the role of science and technology in society?

Methodology

The survey used statistical sampling following PISA-OECD database in Brazil. A subsample was designed, selecting randomly a reduced number of schools, which kept a nationwide significance. The ROSE questionnaire consists of statements in which students are asked to report what their interests are, using a four item Likert scale. Responses range from strongly disagree to strongly agree, with no neutral option. The questionnaire was printed with optical laser personalization of the answering fields, allowing digital capture of the answers. This allows low level (if any) of misleading data (633,820 itens answered).

Results

Os dados relacionados aos temas que mais interessam os jovens brasileiros podem ser observados na figura 1, que se refere às preferências dos meninos e meninas.

The data relating to topics that are most popular Brazilian youth can be seen in Figure 1, which refers to the preferences of boys and girls.

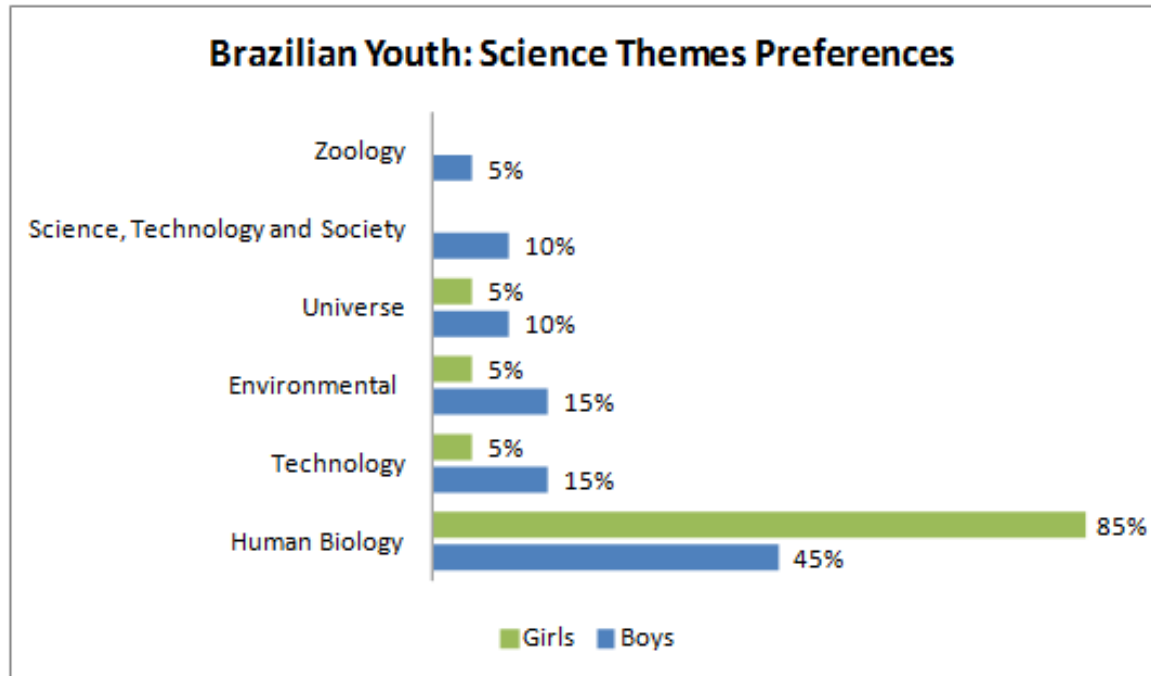


Figure 1 – Science themes that most interest Brazilian youth.

The data obtained in this study demonstrated that young people have great interest in their bodies, how it works, the diseases that affect it, and of course, sex. The science curriculum cannot pass off this fact to become meaningful to the student. The engagement of students in science and for science classes may be driven by strategies that address such issues, so that the existing interest, which is intrinsic to the youngsters may encourage the awakening of interest in other school covered subjects.

Regarding the attitudes of youngsters towards school science, 16 survey questions of ROSE covered such issues. The responses were subjected to factor analysis, which also produced 3 groups of attitudes. The first and most significant concentrated positive aspects related to school science, such as the importance of science to our lives and its benefits, call Pro-Science positives. The second group gathered attitudes of students who clearly prefer science over other disciplines (Prefer-science). The third group addressed attitudes related specifically to the discipline (I learn Science) learning. The averages obtained from these groups are shown in Table 1.

Factor	Variância (%)	Girls		Boys		General		p-value
		Average	SD	Average	SD	Average	SD	
Pro-Science	37,08	2,95	0,692	2,76	0,750	2,87	0,723	<0,001
Prefer-Science	8,45	2,27	0,763	2,37	0,759	2,32	0,763	0,001
I Learn Science	7,24	2,63	3,091	2,52	0,809	2,58	2,411	0,982

Table 1 - Measures and Mann-Whitney test for difference in relation to gender of the students to the factors of group of questions related to science classes.

Regarding the attitudes of young people towards science and technology (S&T), the ROSE questionnaire contemplated 16 questions. Some issues, due to the fact of being emblematic, have been selected in order to present the profile of the young Brazilian in relation to science and technology. The averages obtained from these questions are shown in Table 2.

Questions“My opinions about science and technology”	General Mean	Mean		Difference (H-M)	IC 95 (Dif)	P-value
		Boys	Girls			
Science and technology are important for society	3,25	3,17	3,31	-0,14	[-0.22; -0.06]	0,001
Science and technology will find cures to diseases such as HIV/AIDS, cancer, etc.	3,09	2,99	3,16	-0,17	[-0.25; -0.08]	0,01
Thanks to science and technology, there will be greater opportunities for future generations	3,13	3,05	3,18	-0,13	[-0.21; -0.05]	0,002
New technologies will make work more interesting	3,00	3,00	3,00	0,00	[-0.08; 0.08]	0,795
The benefits of science are greater than the harmful effects it could have	2,55	2,58	2,53	0,05	[-0.04; 0.13]	0,208
Science and technology will help to eradicate poverty and famine in the world	2,33	2,39	2,28	0,11	[0.02; 0.2]	0,020
Science and technology can solve nearly all problems	2,26	2,38	2,18	0,20	[0.12; 0.29]	0,010

Table 2 - Means and Mann-Whitney test for differences in relation to gender of students to issues related to S & T.

Conclusion

This research stated that the subject that mostly arouses the young Brazilian is Human Biology, considering the preferences of boys and girls. Issues related to sexuality, body care, diseases, the food we eat, etc arouse interest and curiosity of young Brazilians.

The materials and science curriculum itself cannot evade this fact and continue repeating a model of content approach highlighting such matters.

Young Brazilians consider science discipline interesting, despite having no preference for science compared to other disciplines. There is a general positive attitude towards the subject, both with respect to its importance as to its usefulness. We found that young Brazilians generally have an optimistic attitude towards science and technology, and they consider it responsible, not only for curing diseases, but also for better future opportunities, more interesting work and successful development of a country. Youngsters attach to S&T the possibility of a healthy, easy and comfortable life, in addition to making work more interesting.

Thus, this research found that young Brazilians have positive attitudes towards school science and the role that S&T has in society, which can provide, since positively stimulated, to an increase in scientific careers in the country.

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