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The perception of nanoscience and nanotechnology by children and adolescents

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Abstract – Exploratory studies show that the field of nanoscience and nanotechnology is still quite unknown for children and adolescents in Brazil and Argentina and it presents several challenges on how to communicate and educate about it. Science centers and museums appear as a good media for this task and represent a good opportunity for life-long learning. Here we shortly present the experience of an exhibition called *NanoAventura* which was developed in Brazil by the *Museu Exploratório de Ciências* from the University of Campinas (UNICAMP).

Exploratory studies conducted in Brazil and in Argentina indicate that children and adolescents not only do not know the meaning of the words nanoscience and nanotechnology (N&N), but also they have serious difficulties in thinking on tiny scales. Furthermore, the studies have revealed that most of the children and adolescents have very little or simply no scientific conceptions on the constitution of matter. These results indicate the need to deepen inquiries on a deeper understanding of the counterintuitive scientific concepts related to N&N in order to look for more effective ways in educating and informing about these new scientific and technological fields.

In this context, communication and education on N&N in museums and science centers appear as a possible contribution. In Brazil the *NanoAventura* exhibition (http://www.mc.unicamp.br/nanoaventura) was developed by the *Museu Exploratório de Ciências*, Unicamp. This interactive exhibit was designed to attract the interest of children and adolescents to nanoscience and nanotechnology, creating a space for learning and entertainment with a playful approach, through images, music and computer games.

An evaluation has been carried out since the opening of the exhibition, and the results show that the experience is of high impact for the target public. By means of questionnaires (n=814) and interviews (n=23) with children and adolescents, we have found that the exhibition offers the possibility of getting the public to be enthusiastic, leading to a kind of double “discovery”: the existence of minute particles and the real possibility to manipulate them at the nanoscale. In the context of the exhibition there exists an understanding of some of the fundamental characteristics leading to the definition of the concept of nanotechnology. Present and future applications of nanotechnology are an attraction factor, and its applications in the area of health appears as the most exciting to the public. As to the attitude regarding N&N, the studied public seems to have an optimistic vision of the technological development in which their concept of nanotechnology is anchored. This position is advantageous from the communicational point of view, since it permits starting a dialogue with a positive tendency. Nevertheless, previous experiences with other technologies show that this is a rather delicate field to deal with, and that many efforts need to be made in favor of an adequate public communication of N&N.

Within the framework of life-long learning [1], we aim to strengthen a diversity of education experiences to achieve a deeper and long-lasting understanding of this complex and interesting field.

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Figure 1: Game microscopy of the NanoAventura exhibition

Figure 2: Overview of the NanoAventura exhibition games.

References

[1] John Falk and Lynn D. Dierking, Learning from museums: Visitor experiences and the making of meaning. Walnut Creek, CA: AltaMira Press, 2000.