

From "fun science" to seductive science

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An opinion paper warning science centres and museums against the shortcomings of “fun science” and arguing for a “seductive science” alternative

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PRESENTING SCIENCE AS "FUN" IS DECEIVING AND COUNTER-PRODUCTIVE. WE NEED TO CHANGE FOCUS

Science centres and museums have undergone a great evolution in recent decades although it seems that, lately, the science museum model has been somewhat stagnant. Since the radical changes of the mid-twentieth century, it has developed towards strategies in which visitor numbers take precedence over other considerations. Alongside a school science that could be described as "boring", a trend has emerged with a focus on "fun science" in museums, hoping to address current shortcomings. In this article we question this view and propose the idea of "seductive science" as an alternative to achieve long-term impact of museum visits.

The "fun science" trend

In recent times, more and more science centres and museums are aligning themselves with the trend of presenting the visitor experience mostly as "fun", thus identifying the visit with a playful activity. A museum visit must certainly be unique and stimulating, but such an explicit identification with fun-related aspects can, in our view, leave out of the picture the wealth of other elements that a visit to a science centre or museum has to offer.

Let us first have a look at various factors that may have contributed to this trend:

- **The focus on visitor numbers as a measure of success.** It is indeed surprising that this is actually taking place in institutions that are meant to show how science works, with visitor numbers becoming, in practice, the only performance indicator of science centres and museums. Mission and vision statements always include a strong societal dimension, such as promoting uptake of science careers (Wotton 2013). Naturally this should be also an important part of the evaluation of success, but we all know how scarce and difficult to obtain such evaluation data are (see for example Cavell & White (2010) for one of the very few longitudinal studies available). As a consequence, there is the risk of just abandoning in practice the role of socio-cultural leadership science centres and museums can have within their communities and replace it with a focus on

activities aimed at attracting ever growing visitor numbers. This is often done without the realm of museographic language, sometimes even under the disguise of bold experimenting with avant-garde museology.

- **The use of business-style market studies.** Institutions with a strong societal focus can certainly use market studies to gain a deeper knowledge of their public and so be able to ascertain what they can offer that is most appropriate. Unfortunately science centres and museums apply such studies in the same way businesses do – in order to learn about public demand and respond to it quickly. Paradoxically, one of the assets of science centres and museums is their ability to offer their audiences experiences previously unknown to them and for which clearly no demand will be detected via a direct and superficial market study.
- **The identification of science centres and museums with leisure venues.** Many members of the public identify science centres and museums as good leisure alternatives for a family day out keeping the children amused, rather than opportunities to share a creative museum experience. Whilst this approach by visitors is certainly welcome, it does not imply that museum managements have to share and cater for it as it is not aligned with the science communication aims and objectives they set themselves.
- **The influence of “Braniac”-style TV shows.** It may seem that science communication works well as a TV product, if one measures by the proliferation of programmes that have some degree of “science” in them, usually through spectacular science demonstrations that are fun and entertaining. Without questioning the good intentions of the producers of such shows, it has to be remembered that their main aim is not to communicate science, but to attract audiences measured by means of “shares”.
- **The influence of trends in schools.** There is a current trend in schools which is concerned with ensuring –to a worrying degree— that pupils “feel good” and enjoy being in class, with the ulterior aim of preventing them from developing a distaste for learning, as it is proven that learning is strongly influenced by the learner’s emotional state (cf. Roth 1980). In this context, the main reason why many teachers take their classes to science centres and museums is for the pupils to have fun with science (Viladot 2012).

In summary, the demand both from school visits and family audiences seem to push science centres and museums to offer fun. Pairing science and fun can, however, bring about some unwanted consequences, as we will discuss in the next section.

Fun Science or Seductive Science?

Identifying science with fun can constitute a deceiving enticement towards science for the public, and in particular for prospective students of science careers, who constitute one of the main target audiences of a number of science communication channels, including science centres and museums.

The day-to-day work of a scientist hardly qualifies as “fun” if one looks at long lab hours, data analysis, or code programming, to mention but a few examples. A final year project supervised by one of us showed that those pursuing a career in science tend to distance themselves further and further from the concept of “fun” in science as they gather experience, and that there are numerous other adjectives they come up with to define science, such as fascinating, interesting, exciting, or important, for example (Stengler, Lyons & Fernández, 2013).

ASSUMING THAT CHILDREN WILL ONLY ENGAGE WITH “FUN” THINGS IS PATRONIZING

In fact, assuming children will only do things they perceive to be fun could be considered a patronizing attitude towards them. Many children get involved in say, environmental or animal protection activities not because they think they are fun, but because they realize they are important (Lemke, 2006). However, repeatedly assuming they are only interested in fun could end up becoming a self-fulfilling prophecy.

Moreover, there is growing evidence that making science pleasant and fun for student does not go beyond improving their attitude towards science, as there is no correlation with decisions towards science careers, as reported by DeWitt, Archer & Osborne (2014). A recent broad study by Reach Advisors has shown that after a few years the most intense memory of a visit to a contemporary museum is often related to real objects of particular museographic value, even in the case of young visitors (Wilkening 2015).

Focusing on fun during science centre and museum visits also leaves out of the picture educational considerations such as science centres and museums being ideal environments for constructivist, inquiry based learning (Gerber, Cavallo & Marek, 2001; Lelliott, 2013; Murmann & Avraamidou 2014). Moreover, this can even have a backfiring effect in that it reinforces the idea that learning in class is inherently boring, the “fun” being outside the classroom.

Another often overlooked danger of the idea of “fun science” is that it dissuades scientists from getting involved in science communication, especially the most renowned and prestigious ones. In a day and age in which we are making a big effort to persuade the research community to get involved in public activities it is important to ensure they feel comfortable with it, and trivializing their work by portraying it as a show without substance certainly does not help.

Towards Seductive Science

We all know that another word for “fun” in English and other languages is “diversion”, in one or other variant. In English the word “diversion” also kept the original Latin meaning of “turning away” from the intended path. This coincidence is a handy illustration of our view that overemphasising “fun” may “divert” or distract from the intended message about science, education or science centres and museums.

As mentioned earlier, there are many other adjectives that can be applied to science and which reflect much better what it represents: fascinating, exciting, thrilling... This is what “seduces” the scientists to make them willing to endure the hard and less gratifying aspects of research. They know that at the end of the process, obtaining results and drawing conclusions is an unmatched intellectual experience.

FUN VERSUS SEDUCTIVE: FROM DIVERSION TO ATTRACTION

“Seducere” means in Latin “to attract” and this is exactly what should be strived to in science centres and museums – and in schools, too, we dare say—: to promote interest for science; to prevent the children’s innate curiosity from fading off with time; to show pupils that a museum visit provides more questions rather than answers; to facilitate that excitement becomes fascination. To do so there are some fundamental elements a school visit should feature, which we list here with our experience and research as a basis, and without aiming to be exhaustive.

Collectively constructed science. The core of a science centre or museum is the exhibition. It should become the *field* where students in small groups collect data, where they observe nature, where the most exciting moments of encounter with the object or the phenomenon will take place. These data can then be analysed in the workshop rooms –their labs—, where they share ideas with their fellow students, and construct their own conclusions, which they can then communicate to the other members of their school or family group. Science is a collective human construction and in science centres and museums, there must be a constant interplay of doing, thinking and communicating, just as in real science, and as such, it is not necessary that everyone in the group does everything: there are different roles, and it is not about having done every single task, but rather about having gone through all intellectual stages and having taken part in the generation of new knowledge as a member of a team.

Science as a story. First, science needs to be portrayed as a human endeavour in constant change, embedded in culture, particularly in the culture of the visitors. To do so, science must be told as a story, scientific language has to become a narrative that links concepts with personal cultural experiences, almost like turning science into a new humanities discipline. Starting an activity as a story based in the use of different communication systems will help creating an emotional bond that can be referred to throughout its delivery.

Science in dialogue with other disciplines. On the other hand, in a museum natural phenomena are presented out of their context. Objects displayed or exhibits that simulate natural processes need educational approaches which redefine their contexts and link them, again, to culture. This cannot be attained if science does not interact continuously with the other disciplines. Science may well be the central axis for a topic, but at the same level as, and in conversation with, other communication systems, the arts, mathematics, etc., so as to incorporate one of the key aspects of any scientific development: creativity.

Consolidating learning. The museum is not a classroom, but the museum’s assets can be developed to be an invaluable complement to classroom learning. In the science centres or museums we have little knowledge of how the teachers make links between the visit and the curriculum (or how the discussion will go on at home), as our contact time with visitors is brief and fleeting. Yet it is clear to us that, since two thirds of the visitors are not only looking for fun but for learning experiences, too, and 100% of teachers hope that learning will take place during the school visit to the museum (Viladot 2012), we must ensure this actually happens. The only way to achieve this is through a facilitated activity at the end of the visit in which participants have to apply their learning and the changes in the way they see reality that have taken place since they arrived. As we will mention below, the interplay of different communication systems and interdisciplinary dialogue will be key to this.

Calm Science. It easily follows from the previous points that, just like science itself, the whole process cannot be completed in haste. A visit to a science centre or museum has to be relaxed. Not only because

science cannot be rushed, but simply because a high level of attention cannot be sustained for long periods of time, and it becomes necessary to alternate between moments of intense stimuli that require high levels of attention and other more relaxed ones that then allow to bring attention back to a high level. This implies that a museum visit, especially a school visit, needs to be as long as possible so as to include the necessary breaks. A whole morning would seem appropriate. But it is not only the delivery of the actual activity that matters, there are other relevant aspects that need to be taken care of: a welcome at reception that is not rushed; moving through the exhibition floor quietly and without running; museum staff talking in a low voice; and everything that contributes to a calm atmosphere. This is radically different from the common scenario in which crowds of children shout and run around, press buttons without paying attention, etc., to the desperation of teachers, parents and museum staff.

All this is certainly not easy. It definitely is not in the absence of a professional education team. It is not if we do not have educators instead of explainers and guides, if we leave these activities in hands of interns without much experience –internships are something quite different— and without resources at their disposal, if we rely on temporary workforces without continuity within roles. Highly knowledgeable educators are needed –visitors hope to meet experts to help them understand (Viladot 2012)—, trained both in the subject matters and in education, and prepared to deal with diverse audiences and adapt any part of the activity to changing audience needs, knowing that it is their only shot with these particular members of the public. We need educators that can cater for very different visitor groups, with radically different needs and unknown expectations.

We know that in the current economic climate, advocating such a working model may seem frivolous, but education is not, and there is a lot at stake. We know that we are not doing particularly well, that citizens do not feel involved in the issues of science and technology, that fewer and fewer young students want to become scientists. We need to act now.

ENTERTAINMENT IS NOT ENOUGH – WE NEED TO AIM FOR LONG-TERM IMPACT

Otherwise we will certainly contribute to the entertainment of the population, but without effecting any change in how they see science in the long run or in their ability to recognise the essence of what we call the scientific method. In such a scenario we do not need science centres or museums – theme parks and shopping malls will suffice.

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Figure Captions

Figure 1: Various children at the Museu Blau (Barcelona), attentively listening to a museum educator about a skull on display. Image: Museu de Ciències Naturals de Barcelona.

Figure 2: Exhibition "Irisceñdium: the soap bubbles lab" at the Engineering College of Tarragona. A fascinated child spends an extended period of time with full attention in order to make an iridescent giant soap bubble. Image: Ruth Dolado.