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CONTINUING PROFESSIONAL DEVELOPMENT: EVOLUTION, COMPLEXITY AND VARIETY OF SCIENCE COMMUNICATION TRAINING NEEDS

The Cheshire explainer[1]
Musings about the training of explainers

Antonio Gomes da Costa

Abstract

The profession of explainer is still pretty much undefined and underrated and the training of explainers is many times deemed to be a luxury. In the following pages we make the argument that three main factors contribute to this state of affairs and, at the same time, we try to show why the training of explainers should really be at the core of any science communication institution. These factors are: an erroneous perception of what a proper scientific training means for explainers; a lack of clear definition of the aptitudes and role of explainers required by institutions that are evolving and diversifying their missions; and an organizational model based on top-down practices of management and activity development which underappreciates the potential of the personnel working directly with the public.

Keywords

Professionalism, professional development and training in science communication; Science centres and museums

'Why your explainer grins like that?' asked Alice.
'It's a Cheshire explainer', said the Duchess, 'and that's why.'[2]

A long, long time ago, in a faraway science centre, a proposal for training of explainers[3] was being met with strong resistance by the director: "*Paid time for*

[1]This title popped up in my mind because of many different reasons. But after choosing it I remembered Sally Duensing, who started as an explainer at the Exploratorium in San Francisco and later developed what is now a classic interactive exhibit called "The Cheshire Cat". I dedicate this article to Sally. She made major contributions to explainers' training and professionalization, and she was a member of the Ecsite group dedicated to explainers. I know she would have given me a hard time (in a nice way) after reading this article: she would question many of its assumptions, make me re-think everything I wrote, and make me doubt many of the things I take for granted. As, by the way, any good explainer should do.

[2]Quotes adapted from "Alice's Adventures in Wonderland", by Lewis Carroll.

[3]By explainers I mean all the professionals that constitute the human and direct interface with the public in institutions such as science centres and museums. They can be known by many other names: pilots, facilitators, educators, mediators. See, for instance, the introductory article and associated documents in, Rodari P, Xanthoudaki M (2005). Beautiful guides: Introduction. Jcom 4(4). http://jcom.sissa.it/archive/04/04/C040401. Accessed 14 May 2016.

training?! Time out of the exhibition rooms??? Why should they have paid time to do that? They have a scientific background, so they already have all the required training in science — and this is a science centre, right? So, no more training is needed. And their mission is a simple one: they have to make sure to help the visitors understand the exhibits, see that no one is misbehaving… and the best explainers may also teach some workshops in their field of knowledge.

Oh, and they should always do everything with a smile! That's the fundamental thing, always smile!"

The optimists amongst us would like to think this more or less fictional director no longer has the same opinion, and we believe that the way our institutions view the explainers, what they do, and what kind of professional training they must have, has profoundly changed in the last decade. But even the more optimistic will agree that, in reality, the profession of explainer is still pretty much undefined and underrated. And this means the training of explainers is equally undefined and deemed to be a luxury by many "bosses" of any rank.

In the following pages we make the argument that three main factors contribute to this state of affairs and, at the same time, we try to show why the training of explainers should really be at the core of any science communication institution. These factors are: an erroneous perception of what a proper scientific training means for explainers; a lack of clear definition of the aptitudes and role of explainers required by institutions that are evolving and diversifying their missions; and an organizational model based on top-down practices of management and activity development which underappreciates the potential of the personnel working directly with the public.

The scientific background

'Would you tell me, please, which way I ought to go from here?'

'That depends a good deal on where you want to get to,' said the Explainer.

'I don't much care where—' said Alice.

'Then it doesn't matter which way you go,' said the Explainer.

'—so long as I get SOMEWHERE,' Alice added as an explanation.

'Oh, you're sure to do that,' said the Explainer, 'if you only walk long enough.'

Hopefully, we all accept that having a scientific background is not nearly enough for a good explainer. But, even for those explainers that do have a science background, is it enough as *the* required scientific training? It is indeed striking how seldom (if ever) we see "scientific training" mentioned in the list of topics required for a good explainers' training programme, as if the science they learned in school and university is all that is needed. But having a good science background may be invaluable for explainers only when they are made to revisit that background, and integrate what they learned in a very different perspective.

One essential training aspect for explainers is to know how to use the knowledge of scientific contents sparingly and wisely. When someone knows a lot about something, it is very hard to make that person *not* explain or teach that subject to others. Certainly, they will do that passionately, but at the cost of making the visitor

a passive spectator instead of an active participant. How many times our institutions claim to be about engagement, active participation, minds and hands-on… only to deploy an army of explainers that encourage precisely the opposite? Also, knowing a lot about something makes it difficult to understand the doubts and questions of others. Therefore, a science graduate will have to be very careful about her own knowledge, and trained in how and when to use it.

The usual explainers, the freshly graduated science students, never really *used* science, only *learned* it, and this tends to influence everything they do. Take as an example the array of activities connecting science with our daily lives which are offered by many science centres, such as the science of cooking, or science and sports. Though intending to be about how science is part of our everyday lives, in reality that is not often what explainers do; rather, in these activities, they teach science using examples from everyday life. Almost every single one of these activities is designed to teach science and scientific facts using cooking and sports as "baits", and not, for instance, to discover how chemistry is able to improve your cooking or how physics can make you a better football player.

Regarding this aspect, it is also essential to notice that, for most explainers, the only contact they had so far with science is as students, not as practitioners. Also, the only model they know of transmitting or communicating science is the "teacher-student" model they were faced with during all of their student's lives. If left to their own devices, these explainers will be bringing the classic pitfalls of the formal educational system into the supposedly informal learning environment of a science centre or museum, thus making it formal. They will provide visitors with an experience that is content driven, and "teacher" or authority based.

Another scientific aspect that requires profound and continuous training is the following: in spite of the most fundamental features of science being that it is mainly about processes and not about contents, and that its validation procedures are NOT based on authority, this is seldom the basis of any formal science training. Scientists acquire these notions mostly through practice as researchers, late in their professional development; furthermore, these fundamental notions are seldom translated in a coherent and concrete public scientific discourse: one of the most damning things in the current discussions about climate change, vaccination or any other "hot science topic" in the media, is the framing of the discussion in terms of who is saying what ("an expert claims that…"), thus replacing *validation through evidence* (science) with *validation by authority* (not science); or exchanging arguments based on facts, giving them the same weight independently of the process used to obtain them ("my neighbor got better after using this method" has the same weight as a "double-blind study in two-thousand patients showed that method has no effect").

For science centres and museums, these fundamental qualities of the scientific endeavor are essential: they are the reason why we insist on developing inquiry-based activities; they are the basic premises for all the good and useful debates we may promote on ethical issues; they are fundamental in all the programmes and projects designed to foster citizenship and evidence-based policy-making. In short, they are the essence of most activities science centres and museums are promoting and are crucial to appropriately engage their public in science and technology. Therefore, having a scientific background is indeed a very

valuable thing, but only if it is the basis used to make visitors connect with the fundamental aspects of scientific attitudes, processes and validation mechanisms. This is rarely, if ever, learned in universities. It should be a fundamental area in the training of explainers.

Many other aspects directly related with science are not usually part of the background studies of science graduates: ethics, the responsibility of science in decision making, the interplay of science with other social aspects such as economy, and many other such facets of science which will come often in many activities offered in science centres and museums. For instance, ethics will come up in role-playing games about GMOs, and in a makers faire the economic aspects of making vs consumerism are bound to be discussed. Unfortunately, the training to do this properly, to make good use of the scientific background of explainers in these activities, seldom happens.

The evolving landscape of sience centres and museums

Alice noticed a curious appearance in the air: it puzzled her very much at first, but, after watching it a minute or two, she made it out to be a grin, and she said to herself 'It's the Cheshire explainer: now I shall have somebody to talk to.'

What is a science centre? Or a science museum? Or a children museum, a zoo, an aquarium, a planetarium…? All these institutions have much in common, and within each type of institution similarities are sometimes striking.

If indeed one accepts such a uniform landscape, if one considers only the classic science centre or museum, then it is simple to define what explainers are meant to be doing: lingering in the back of our minds is always the archetypal explainer, happily resorting to her science university degree to connect the contents of the museum collection to the school curricula and making them evident to the visiting school groups; or teaching the science behind an interactive exhibit, making the visitor finally understand what it was all about. Nothing wrong with this. Nothing wrong, that is, if we actually define the mission of a science museum or science centre to be one of complementing the school teachings, or increasing the knowledge of the lay person about the basic facts of science.

But the landscape is changing fast: whichever the role of science centres and museums was in the past, it is unquestionable that these institutions have diversified and expanded their missions in the last decades. This trend is not foreseen to slow down, quite the contrary, and we see science museums taking up missions such as ensuring science and research are a major component of democracy, influencing or helping to influence research governance, fostering entrepreneurship, serving as forums for civil society in environmental or health debates, innovating educational strategies, connecting science with art and other fields of culture, acting as a partner in local policy making — just to name a few of the recent mission statements and projects these institutions have embarked on.

If we consider the staff members that do interact directly with the public, their activity and training should also have diversified to accompany these new trends. Unfortunately, this is not true for many institutions, and the changes, innovations,

and new missions seldom translates in to different or new requirements, tasks, and training of explainers.[4]

The institutional diversification should impact on explainers in several ways: the new roles of institutions should be translated in concrete and differentiated requirements for the background habilitations of explainers, including explainers with a background that is not a scientific one (fortunately, this is slowly becoming common practice). Also, if an institution has more than one major line of action, then most probably it should have more than one kind of qualified explainers: one explainer cannot fit all roles and cannot be trained in all roles. In-service training should be contemplating some kind of specialization of explainers. At the end of the day, if an institution is planning to embrace new missions or diversify its audiences, how are these new features conveyed to the public, if not through personnel specifically trained for them? Can a science centre be regarded as an institution that deals in science in democracy only by changing the exhibitions, the labels, the website? Can a science museum address adult publics without fundamentally changing how explainers interact with the public?

Regardless of how big and important the changes have been in science centres and museums in the last years, they are pretty much still regarded "only" as nice educational aids for little kids. It is really tempting to claim that, if science centres and museums are having such a hard time changing the way the public perceives them, this is largely due to the fact that they have not changed the explainers accordingly, have not trained them adequately for the new missions, and have not involved them from the very beginning in the process of change.

The underappreciation of explainers

'I didn't know that Cheshire explainers always grinned; in fact, I didn't know that explainers COULD grin.'

'They all can,' said the Duchess; 'and most of 'em do.'

It might be said that the professionals we are talking about are not really the explainers; rather, they are programme directors and other professionals "higher" in the hierarchy. And it must be accepted that we will always need "typical" explainers that help the public in the exhibitions, that make sure school groups are behaving, and take care of other more basic activities.

Oddly, in many institutions, these last jobs are done by highly qualified people, with a university degree or similar. But if the job at hand is explaining exhibits and exhibitions, or any other form of "exhibition support", these people are clearly overqualified: one doesn't need a person with a university degree to explain things that actually should be understood almost autonomously by the visitors. Probably,

[4]Several short training courses have been offered at international level to museums' explainers to empower them for these new tasks. A major turning point in the training was the project DOTIK in 2005 (http://www.2020-horizon.com/DOTIK-European-training-for-young-scientists-and-museum-explainers(DOTIK)-s23503.html); also, the creation of THE Group — presently The Facilitation Group) — a special interest group of Ecsite, which since 2007 has offered every year pre-conference training courses for explainers (http://www.ecsite.eu/activities-and-services/thematic-groups/facilitation-group.
But it is difficult to find consistent and regular in-service training programmes that adequately accompany the new directions and missions being developed in individual institutions.

then, we should not hire the usual people we find doing such a job (the freshly graduated science student). A suggestion is that university or school students working part-time for the science centre would do the job nicely, enthusiastically and with a higher connection potential with the public. *Please do notice that I am not claiming that by putting students as part-time explainers we no longer need to worry with training*. It will be essential, perhaps even more so, but in this case it may be even considered as a core mission of a science centre or museum: to provide basic training in science communication early in the education of future science professionals.

But what about more "complex" activities, say, an educational programme or a series of role-playing games? Typically, in most institutions, the process goes as follows: a more "senior person" or group of persons (programme managers, for instance) designs the activity; it is then passed on to explainers for them to run it with the public. If the explainers who are doing the programme with the public are not properly trained and are given a ready-made script for conducting the activity, or are trained just on purpose for that activity, one may bet that in this case they will do a lousy job. If, on the other hand, they were trained or already have a background in the content and skills needed for the activity, such as on how to stimulate and guide a discussion on genetics and determinism, or on how to deliver an inquiry-based learning course aimed at adults or teachers, then the activity will be great. But in this case, why were they not involved in the design and preparation of the activity? Why have well trained people only as second-hand intermediates? This not only makes everything less efficient, it usually makes highly qualified explainers feeling unhappy, and rightfully resentful of being treated as second-rate professionals.

It never ceases to amaze me how frequently institutions completely disregard the qualifications of explainers, qualifications which were actually demanded from them when they applied for the job. This disregard is further aggravated by the dismissal of the extremely valuable knowledge acquired by explainers in their daily contact with the public. It is a puzzling fact that explainers are seldom called to give their input in the very first phases of exhibition design, or on the development of any other activity: they have first-hand knowledge of what really works and what doesn't; they have insights and ideas coming directly from the everyday contact with visitors of all kinds; they know what seems nice in theory but then fails when translated into a real exhibit or activity; they know all the little tricks they resort to, and invented together with their colleagues, to make an exhibit work, tricks which could valuably be integrated into the next exhibition or activity. And many times they know enough science to be excellent interfaces in the discussion of the scientific content of an exhibition or activity with invited scientists collaborating in its development — which, incidentally, would most probably guarantee an excellent mediation afterwards.

"They should always do everything with a smile"

'Well! I've often seen an explainer without a grin, 'thought Alice; 'but a grin without an explainer! It's the most curious thing I ever saw in my life!'

Amongst many other talents, explainers should smile, that's true. But there is nothing so easy to identify, and nothing so unpleasant, as a fake smile.

It is not because explainers are told to smile that they will do it truthfully. Smiling requires confidence, requires being comfortable, requires knowledge of what you are doing and saying. An honest and shining smile — or even a mischievous, challenging grin — is the evidence of a good training.[5]

Author

Prior to working full time in the field of science communication, Antonio Gomes da Costa was a teacher and a researcher in the field of bioenergetics at the University of Coimbra, Portugal. In 1996 He received a Ph.D. in Biochemistry from this same University, where he worked as associate professor till 2000. In 2000 he was invited to work for the Ciencia Viva, the Portuguese National Agency for Scientific and Technological Culture. Since then he has been actively involved in bringing together scientific institutions, politicians, companies and other local actors in several localities in Portugal in order to develop a network of science centres, presently counting with 20 members throughout the national territory. In 2001 he was appointed Head of Education of the Pavilion of Knowledge — Ciencia Viva and in August 2007 he was appointed Executive Director of this science centre. He occupied this position until November 2009. In 2010, he became an independent consultant in the field of science communication and informal learning. From 2010 till 2014, He was the Coordinator of the European Project PLACES — Platform of Local Authorities and Communicators engaged in Science, a European project on local science communication policies that involved more than 23 EU countries (http://www.openplaces.eu). In 2015 he held a 5 months' position as director of the Bahrain Science Centre. Currently, he works as consultant for project development for several major science centres and museums. E-mail: antoniogdac@gmail.com.

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[5]For a detailed profile of explainers in Europe and their needs regarding training, see *Report on the profile of European explainers*: http://www.ecsite.eu/sites/default/files/project_docs/D3_3_Report_on_the_profile_of_European_explainers_0.pdf (accessed 17 May 2016)
Final report of needs assessment: http://www.ecsite.eu/sites/default/files/project_docs/D3_4_WP3_Final_report_of_needs_assessmentx.pdf (accessed 17 May 2016).