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`louis.marinho.fernandes@gmail.com`

Communicating science through social media: a case study at CERN with NA61/SHINE and Instagram

Louis Marinho Fernandes, under the supervision of Andrey Seryakov

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Summary

In this project, we reflect upon the need for science communication and upon how the internet can be used as a mean to transmit knowledge to various audiences, including students and academics. We outline the advantages of using social media as a way to communicate science, while identifying the limitations of such tools. We put these ideas in practice by managing the Instagram page of a CERN experiment, NA61/SHINE. We describe the process used to create and publish content, before discussing some of the difficulties faced during the internship, as well as possible future projects related to scientific outreach.

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1 Introduction

1.1 The NA61/SHINE experiment

NA61/SHINE (SPS Heavy Ion and Neutrino Experiment) is an experiment taking place at CERN, in the North Area of the Super Proton Synchrotron (SPS). SHINE is a fixed target experiment that measures hadron production in nucleus-nucleus collisions, proton-proton interactions and hadron-nucleus interactions. Its main objectives include studying the properties of the onset of deconfinement, determining neutron beam properties, and modelling cosmic ray showers. [1] Today, researchers from more than 30 institutions work together in SHINE. [2]

1.2 Science communication and social media

As a major scientific institution of international stature, CERN has a particular responsibility to contribute towards educating future generations and keeping the general public informed about recent scientific developments. Failing to engage in appropriate and efficient science communication with a wide audience could result in the emergence of a chasm between academics and non-specialists.

Many students from underprivileged backgrounds are interested in science but may be deterred from studying a scientific subject at university level. Exposure to science outside of the classroom can contribute to spur vocations and start potential careers.

Moreover, researchers themselves can find advantages in engaging in such communication online, as writers but also as a member of the audience. Although polymathy declined over the last century as science became more and more specialized, academics can still largely benefit from keeping themselves informed about other scientific fields and experiments than their own. Learning about various scientific endeavours can help them broaden their perspective and build a more all-rounded knowledge of science.

Some of the most powerful communication tools available today are undeniably social media. While traditional ways of sharing scientific information with non-specialized audiences, such as science magazines and books, remain useful, social media often have something different to offer: interaction. Academics can use social media to engage in a dialogue with the public, thanks to various features and tools such as frequent updates, the possibility to comment posts and to in turn reply to comments themselves, the ability to hold QA sessions and even virtual tours, etc. Social media can therefore be used not only to share scientific knowledge per se, but also to show how researchers work on a daily basis, or to display the facilities they work with.

1.3 The NA61/SHINE Instagram page

The NA61/SHINE experiment has an Instagram page that can be found under the name @shine.experiment. [3] Its first post was published in November 2019, but no new post had been published in more than four months when this internship started. Reviving the page had become urgent, new content was needed to keep current followers and to attract new ones.

One of the primary targets of the Instagram page are physics students who are interested in high energy physics and who want to learn more about specific CERN experiments. Some of them might have a previous connection with CERN, but others do not. The Instagram page can also be followed by academics and graduate students who either work in particle physics or in another field of science and who want to broaden their perspective and widen the breadth of their knowledge.

The new content needed to be suitable for these different types of audiences: we wanted to publish posts that would be interesting even for the experts, while remaining accessible to the non-specialists.

2 Method

2.1 The different types of content

The Instagram posts we have written fall within the following categories:

- History posts, telling the story of SHINE and of its precursor, the NA49 experiment
- Posts about people working at SHINE, detailing their role and their missions
- News posts, about what is going on at SHINE at the moment, and what the future plans are for the experiment
- Science posts, explaining key concepts about the research that is undertaken at SHINE, showing the facilities, and discussing their use

2.2 Writing and publishing an Instagram post

2.2.1 Identifying reliable sources

It is easy to feel overwhelmed by the wealth of sources available today, especially online. One of the first missions of the science communicator is to navigate through this plethora of resources and to identify sources that are serious and reliable. Sources that were used for this project include the main NA61/SHINE website, websites of recognized scientific institutions (CERN, NASA, etc.), primary sources such as peer-reviewed scientific papers, and tertiary sources (such as encyclopedic articles) when the secondary and primary sources they used were clearly identified and deemed reputable.

2.2.2 Gathering information

Using the sources selected during the previous step, it is then essential to read extensively to get a general understanding of the subject. This step can take a long time. This is the right moment to start taking notes about what is being read: these notes will later be extremely useful to write the first draft of the post.

2.2.3 Selecting information

Instagram posts have a limit of 2,200 characters per post. It is therefore necessary to carefully select what information needs to be included or excluded. The selection criteria retained are the accessibility of the information to non-specialists, the level of interest that the information can potentially trigger among the different audiences, and the quality of the scientific content. We must also select the images that will be used in the post. These images can be photos, diagrams, sketches, etc. They can be illustrative (especially for the history posts), but they can also convey useful scientific information. If the images were created by another person, we need to make sure that the license under which they were published allows us to use them on social media, with appropriate credit.

2.2.4 Writing a first draft

A first draft is written, trying to use a language as clear and as precise as possible. The information transmitted needs to be both accurate and accessible. Concepts can be simplified, mostly by avoiding to mention complex mathematical notions, but this simplification should never come at the cost of distorting the truth. This requirement is one of the keys of good science communication.

2.2.5 Supervisor review and subsequent amendments

The supervisor reads the draft, and proposes possible amendments. Some parts may lack details, while others might dive too much into complicated explanations. Taking into account the suggestions from the supervisor, the post is modified accordingly.

2.2.6 Publishing the post

The post is finally published online. The choice of hashtags can prove critical: indeed, if users are interested in certain topics, they may enter a number of keywords preceded by a hashtag in the Instagram search bar; the Instagram algorithm will then display a series of recent posts that include the said keywords. Therefore, it remains a potentially efficient way to reach people who are not followers of the page yet, but who might be interested in the new post, and who may eventually start following the page.

Different people can also be identified, or "tagged", on the images, if they include photographs of individuals. Finally, a location can also be added. All these factors can contribute to the number of people who will be reached by the post.

It is important to take into account the day and time of publication to maximise the number of people reached. But another difficulty arises from the fact that the audience of the NA61/SHINE Instagram page is international. We decided to publish posts and stories when it was daytime in Geneva, to align with the main CERN Instagram page.

2.2.7 Monitoring the post

Instagram allows professional accounts to access various statistics about each publication, such as the number of accounts reached by the post (including people who did not already follow the account), the number of times the post was opened from a hashtag, as well as how

many people shared the post. These statistics are important to identify successful posts, and can be used to plan the features of future publications.

2.3 Instagram stories

Instagram stories are temporary posts that are only accessible for 24 hours. They allow for a lot of interaction, with features such as polls or Questions and Answers. We usually published one or several stories to promote newly published posts, in order to attract the attention of followers. Instagram stories could also be used in the future to share short interviews of NA61/SHINE researchers talking about their work, their daily life as a scientists, or replying to questions asked by followers.

3 Analysis

3.1 Difficulties faced during the project

One of the main hurdles faced by science communicators is the difficulty to find a good balance between sharing content that is entertaining and content that is mostly informative. This difficulty becomes even more serious with social media, given their emphasis on visuals and the limitations they usually put on the number of characters that can be published in a single post. If a social media account posts content that is purely academic, it might only attract a very limited number of followers: the objective of widening access to scientific information would therefore fail. On the other hand, if the said account focuses on content that is entertaining but of little informational and scientific value, the educational purpose of such an endeavour is lost.

Another problem that arises is the difficulty to find the right tone that should be adopted, as well as the right level of complexity of the information conveyed, given the variety of the audiences of the NA61/SHINE Instagram account (people interested in science, students, academics, etc.).

Before the internship started, the Instagram page had been inactive for four months. A new frequency for publications had to be agreed upon. Too many posts could create a lassitude, while too few could send a wrong signal too by suggesting that not much was going on at the moment. Accordingly, we decided that publishing one post every two weeks would be a good frequency.

Reaching new audiences remained one of the most difficult tasks faced during this project. To attract new followers, one of the practices that we experimented was to like multiple science-related posts from users which were not followers of the NA61/SHINE page yet, in order to trigger potential interest from people who had already manifested their passion for science. This method was time-consuming and only led to a marginal increase in the number of followers of the account.

3.2 Possible future developments

Future projects will be needed to determine the optimal ways to reach a high number of followers. Exploring the potential of other social media (TikTok and Facebook for example)

as science communication tools would also be useful. Finally, other online tools such as encyclopedic articles should also be considered for further investigation, as they may be used to present scientific concepts that are too complex to be addressed through social media posts.

4 Conclusion

Communicating science to a wide audience while maintaining high standards of scientific quality is one of the great challenges of our time. Given their presence in our daily life and all the possibilities they offer, neglecting social media as a way to share our passion for physics would most likely be a waste of opportunity. Social media allow us to reach new audiences and to engage in interesting dialogues with the public. Despite their severe limitations, social media still offer exciting features, and they can be used to increase the overall quality of the scientific web. Future projects will be needed to determine how to reach more people efficiently when communicating about CERN experiments, possibly using other online platforms in addition to Instagram.

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