PROCEEDINGS OF SCIENCE

The Significance of Social Media in Physics: Insights from a Social Media Secondee at the CTAO

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This proceeding discusses the significance and impact of social media in the field of physics. It explores how platforms such as Facebook, Twitter, and LinkedIn can be used effectively for promoting research interests, simplifying complex concepts, and fostering international collaboration. The proceeding also presents insights from my personal experience as a Social Media Specialist Secondee at the Cherenkov Telescope Array Observatory (CTAO). It highlights successful initiatives like the "Physicists On-Call" program and diversity series at the CTAO, demonstrating the potential of social media in enhancing research visibility, promoting diversity and inclusion, and building an international physics community. The proceeding concludes that the evolution of physics requires physicists to adapt to new communication methods, and embracing social media can lead to new discoveries, collaborations, and a more diverse and inclusive physics community.

High Energy Astrophysics in Southern Africa 2023 (HEASA 2023)
September 5 - 9, 2023
Mtunzini, KwaZulu-Natal, South Africa

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PoS(HEASA2023)013

1. Introduction

Discussing the significance of social media in the field of physics might initially seem odd, given the apparent disconnect between the two. While they may seem worlds apart, both fields require effective communication. This need is obvious in social media, but in physics, it is more of an underlying factor. Nonetheless, communication plays a significant role in both. Communication is crucial for social media platforms to not only stay active, but also to be dynamic and engaging. In the realm of physics, communication is key to explaining complex concepts, sharing research findings, and fostering collaboration. Just like social media, physics also greatly benefits from the exchange of ideas, the discussion of findings, and the mutual growth of knowledge. Despite the critical role of communication in both social media and physics, it comes with its own set of challenges. According to an article on Varsity College's website, the potential for miscommunication on social media platforms is a significant concern, as the absence of non-verbal cues can lead to misunderstandings (Varsity College, 2023). Similarly, in physics, the main challenge is making complex concepts understandable to the general public. SlideModel (no date) emphasises that math and science concepts are particularly difficult to communicate to a general audience, as these concepts require in-depth study and time. SlideModel (n.d.) also suggests that experts need to develop effective communication skills in order to avoid such issues.

This proceeding will further discuss effective communication in the physics field, the role of social media in physics, its impact on research visibility, and how it fosters communication. Given the limited research on the significance of social media in physics, I will draw upon my experience as a Social Media Specialist Secondee at the CTAO to inform these conclusions.

1.1 What is Social Media?

Before delving into the significance of social media in physics, it is essential to understand what social media is. According to Kaplan & Haenlein (2010, p.61), "Social Media is a group of Internet-based applications that build on the ideological and technological foundations of Web 2.0, and that allow the creation and exchange of User Generated Content". Kaplan & Haenlein (2010) mention that while it is generally accepted that Wikipedia, YouTube, Facebook, and Second Life belong to the broad category of Social Media, there is not a universally agreed-upon method for classifying various Social Media applications. The task of categorising social media platforms has become even more challenging due to the increasing number of platforms available nowadays. According to Shewale (2024), a typical social media user alternates between six to seven different platforms monthly. Given the increasing number of social media platforms, any method used to sort them should also accommodate future applications. Kaplan & Haenlein (2010) recommend utilising theories from media research and social processes to develop a classification system, enhancing understanding of social presence and media richness, both critical to Social Media.

1.1.1 Social Presence

As cited in Kaplan & Mazurek (2018), Short, Williams & Christie (1976) define social presence as the extent of possible interaction, encompassing sound, sight, and physical contact. In the context of social media, social presence refers to the sense of being "there" and "real" in a virtual environment. It involves the perception of interpersonal interactions and the level of awareness of other individuals in a conversation or interaction, even when participants are not physically present. When considering the array of social media platforms available today, it is crucial to recognise that each one embodies a unique social presence, setting it apart from the others. This unique social presence is a defining characteristic that shapes the way users interact, communicate, and engage on these platforms. Consider Facebook, the most popular social media networking site with 3.05 billion Monthly Active Users (MAUs) as mentioned by Shewale (2024). Facebook, with its extensive audience, provides a variety of features that allow users to promote themselves personally, professionally, and commercially. Consider LinkedIn as an example of a distinct social presence. As a professional networking platform, it caters to professionals seeking to develop their careers and expand their professional networks. Finally, Instagram is considered a more visual social media platform due to its emphasis on the use of images and videos. These examples illustrate the importance of characterising different social media platforms based on their presence. It also raises the question of the social media presence in the field of physics and which platform is most effective for communication within the physics community.

1.1.2 Media Richness

Media richness, as defined by Daft & Langel (1986) and cited by Kaplan & Mazurek (2018), is the volume of information that can be communicated within a specific timeframe. One of the main objectives of social media is to distribute content quickly in an effort to reach as many people as possible. In social media metrics, this is known as the reach of a post or page. According to Shewale (2024), a social media user, on average, spends approximately 2 hours and 24 minutes daily on various platforms. Despite users spending a substantial amount of time on social media, they are increasingly preferring content that is worth their time and avoiding content that wastes it. In the field of physics, this is an additional factor to consider. The main challenge of discussing physics on social media is to present it in a way that the general public can understand within a limited timeframe. Due to the complexity and vastness of physics, physicists invest a significant amount of time to understand the subject. However, it is necessary to simplify and break down the content into smaller, easily understandable pieces for the general public to comprehend within a shorter timeframe. To address this, physicists need to find a balance between making their research accessible and maintaining the integrity of their work. The following section of this proceeding will delve into these topics, underscoring the importance of social media in the field of physics. The goal is to highlight how social media can be a valuable tool for physicists, serving not only as a platform for sharing and discussing research but also as an effective communication medium.

1.2 The Significance of Social Media in Physics

As previously mentioned, social media not only helps in explaining complex concepts but is also a valuable communication tool in physics. It facilitates the sharing of research findings and promotes international collaboration. Physics is a highly collaborative field. Therefore, using social media can assist physicists in sharing ideas, discussing projects, and collaborating on research.

1.2.1 Social Media as a Communication Tool in Physics

Social media provides a platform for making physics more accessible. It allows us to demystify complex concepts for a broader audience in an engaging and straightforward manner. To maximise this impact, it is important for physicists to employ common language to ensure comprehension for all. This is a complex task, but to accomplish it, we need to understand which social media platforms are most effective for sharing scientific information and why.

The most important social media platforms to focus on are Facebook, Twitter, and LinkedIn. According to Waechter (n.d.), Facebook, Twitter, and LinkedIn, often referred to as the "Big 3," have the potential to serve as the most effective scientific networks when utilised skilfully for promoting research interests. Utilising Facebook is crucial for physicists as a study by Hitlin and Olmstead (2018) indicated that science-related Facebook pages attract millions of followers, but they tend to feature practical tips or advertisements rather than scientific findings. This finding is particularly interesting. A conference participant pointed out to me that despite their effort in posting their research papers, they received no engagement or traction. However, the participant was referring to the use of Twitter, not Facebook. Twitter offers several benefits for the scientific community. As stated by Wachter (n.d.), some studies show that academic tweets can increase citations and paper downloads, serving as an alternative method for establishing presence within the scientific community. Lastly, LinkedIn is often more accepted among scientists, possibly because this network is viewed as a high-status platform, mainly geared towards professional purposes (Wachter, n.d.).

While the benefits of using social media platforms are clear, physicists may be reluctant to adopt them. This hesitation could stem from a perceived lack of results or concerns about damaging their professional reputation. Physicists may prefer exclusive or professional networks that they are accustomed to, given these platforms are often more regulated and reviewed. Unregulated content on social media could be seen as irrelevant or untrustworthy. Despite these challenges, social media remains a vital tool for expanding research and fostering international collaborations.

1.2.2 Research and Collaboration

Physicists can leverage social media to exchange ideas, discuss projects, and collaborate on research, potentially accelerating scientific discovery. Platforms such as Twitter, LinkedIn, and arXiv facilitate these interactions by enabling researchers to share their work quickly and informally. arXiv is primarily used for publishing early versions of scientific papers, functioning

more as a formal platform. This is in contrast to Twitter and LinkedIn, which are popular social media platforms used by physicists to share their work, ask for thoughts, and have science discussions in real time. Utilising social media can speed up the research process and encourage the sharing of ideas across different places and organisations. Moreover, social media facilitates collaboration by enabling researchers to connect with like-minded individuals, form virtual research groups, and organise remote seminars and workshops.

However, even though social media facilitates online interaction, in-person meetings may still be the preferred method for physicists, at least in tandem with virtual meetings. In the wake of the COVID-19 pandemic, there has been an increase in both in-person and virtual meetings. Athitakis (2023) cites the Omnipress' 2023 Conference Industry Report, which illustrates an increase in the percentage of organisations that held in-person conferences in 2022. The figure rose to 49 percent, up from 37 percent in 2021. Interestingly, the percentage of organisations hosting hybrid meetings saw a significant increase, from 18 percent in 2021 to 47 percent in 2022. As Athitakis (2023) suggests, this trend indicates that meeting planners may not be fully committed to in-person events. Regardless of preference for in-person or virtual interaction, networking is a crucial component for physicists to advance their research.

1.3 Insights from a Social Media Secondment at the CTAO

As stated earlier, my insights are largely shaped by my experience as a Social Media Specialist Secondee at the Cherenkov Telescope Array Observatory (CTAO). The Cherenkov Telescope Array Observatory (CTAO) is the next generation ground-based instrument for gamma-ray astronomy at very-high energies. With 64 telescopes positioned in both the northern and southern hemispheres, the CTAO will be the first open ground-based gamma-ray observatory. It will also be the world's largest and most sensitive instrument for studying high-energy phenomena in the Universe.

As a Social Media Specialist Secondee at CTAO, I have had the opportunity to gain first-hand experience in understanding the crucial role of social media within the field of physics. The CTAO has used communication as a tool to break down barriers between physicists and the general public through their program, "Physicists On-Call". This educational program brings experts in science and technology into classrooms and professional meetings worldwide, catering to both curious students and astronomy professionals. Any member of an educational institution (whether primary, secondary, collegiate, or post-graduate) or an astronomy association can request a talk. They can do so through a request form available on the "CTAO for Educators" page. This is an ideal example of how to bridge the gap between the realms of physics and the general public.

There is a notable gap in the field of physics when it comes to diversity and inclusion. Social media can be an effective tool for promoting these values. The CTAO maintains ongoing diversity series on social media to uphold these principles. Series such as "Building from Diversity" and "Women of CTA" are included. The "Building from Diversity" series is a monthly compilation of articles that highlight prominent individuals from underrepresented groups in science. In a similar vein, the "Women of CTA" series invites women in the field to share their

professional experiences and participate in roundtable discussions on current news and important topics in the field.

Social media performance analysis of the CTAO confirms the necessity of nurturing robust communication within the physics community, especially the CTAO community which has members worldwide and emphasises the importance of international collaboration. Social media insights indicate that this community is highly engaged not just with scientific discoveries and breakthroughs, but also with the idea of a scientific community itself. Posts related to conferences, meetings, and CTAO members receive higher engagement, reinforcing the importance of maintaining strong online connections globally.

1.4 Conclusion

In summary, social media significantly influences the field of physics. It simplifies complex concepts, fosters international collaboration, and enhances research. Despite potential drawbacks, such as damage to professional reputation or delayed results, the benefits of these platforms are clear. Successful initiatives like the "Physicists On-Call" program and diversity series at CTAO demonstrate social media's potential. As the field of physics evolves, it is crucial for physicists to adapt to new communication methods. Embracing these changes will only improve the field, leading to new discoveries, collaborations, and a more diverse and inclusive physics community. As the experience at the CTAO suggests, social media is not only a platform for sharing scientific discoveries but also a space for building a vibrant, engaged, and diverse scientific community.

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