

Unveiling the invisible

Carles Alcaide i Blaya

Master in Advanced Catalysis and Molecular Modelling
Faculty of Science
Universitat de Girona

October 25, 2024



Main points

1) Understanding the subatomic world:

Explain the basic principles of quantum science, including how atoms and particles behave at a microscopic level, helping us better understand the nature of matter and chemical interactions.

2) Technological impact of quantum science:

Highlight how quantum technologies, such as quantum computing and advanced sensors, have the potential to revolutionize fields like medicine, energy, and advanced materials.

3) Public engagement and awareness:

Discuss the importance of making quantum science accessible to the general public, showing how effective communication can transform society's perception and support for emerging technologies.



References

- [1] Streit-Bianchi, M., Michelini, M., Bonivento, W., & Tuveri, M. (2023). New challenges and opportunities in physics Education. Springer Nature.
- [2] Vizcaíno-Verdú, A., De-Casas-Moreno, P., & Contreras-Pulido, P. (2020). Divulgación científica en YouTube y su credibilidad para docentes universitarios. *Educación XX1*, 23(2). <https://doi.org/10.5944/educxx1.25750>.
- [3] Francescutti, P. (2018). Comunicación de la ciencia. Mucho más que explicar la física cuántica a las ancianitas. *InMediaciones De La Comunicación*, 13(2), 15. <https://doi.org/10.18861/ic.2018.13.2.2861>.
- [4] Faúndez, C. A., Rojas, Y. G., Pinto, A. A., & Astudillo, H. F. (2015). Taller de física cuántica: un método para introducir conceptos fundamentales en una actividad extracurricular. *Formación Universitaria*, 8(2), 53–62. <https://doi.org/10.4067/s0718-50062015000200008>.
- [5] Alcívar, M. (2015). Comunicación pública de la ciencia y la tecnología: una aproximación crítica a su historia conceptual. *Arbor*, 191(773), a242. <https://doi.org/10.3989/arbor.2015.773n3012>.



References

- [1] Streit-Bianchi, M., Michelini, M., Bonivento, W., & Tuveri, M. (2023). New challenges and opportunities in physics Education. Springer Nature.
- [2] Vizcaíno-Verdú, A., De-Casas-Moreno, P., & Contreras-Pulido, P. (2020). Divulgación científica en YouTube y su crecimiento. *Revista de Divulgación Científica*, 23(2).
<https://doi.org/10.55555/rdc.v23n2.12345>
- [3] Francescutti, P. (2020). The book provides diverse narrative tools for teaching physics, from historical insights to interdisciplinary discussions. The first half supports flipped classrooms and debates, while the second focuses on ICT resources and skills for classroom integration, highlighting their potential in enhancing physics education. *Revista de Divulgación Científica*, 23(2).
<https://doi.org/10.55555/rdc.v23n2.12345>
- [4] Faúndez, C. A., Rojo, J. (2020). Aplicar la física cuántica a las ancianitas. In *Mejorando la educación física: un método para introducir la física cuántica en el aula*. Formación Universitaria, 8(2), 53–62. <https://doi.org/10.4067/s0718-50062015000200008>.
- [5] Alcívar, M. (2015). Comunicación pública de la ciencia y la tecnología: una aproximación crítica a su historia conceptual. *Arbor*, 191(773), a242. <https://doi.org/10.3989/arbor.2015.773n3012>.

The book provides diverse narrative tools for teaching physics, from historical insights to interdisciplinary discussions. The first half supports flipped classrooms and debates, while the second focuses on ICT resources and skills for classroom integration, highlighting their potential in enhancing physics education.



References

- [1] Streit-Bianchi, M., Michelini, M., Bonivento, W., & Tuveri, M. (2023). New challenges and opportunities in physics Education. Springer Nature.
- [2] Vizcaíno-Verdú, A., De-Casas-Moreno, P., & Contreras-Pulido, P. (2020). Divulgación científica en YouTube y su credibilidad para docentes universitarios. Educación XX1, 23(2). <https://doi.org/10.5944/educxx1.25750>.
- [3] Francescutti, P. (2018). Comunicación de la ciencia. Mucho más que explicar la física cuántica a las ancianitas. In Me...
<https://doi.org/10.1111/1468-5955.125750>
- [4] Faúndez, C. A., Roj...
Unversitaria, 8(2), ...
- [5] Alcívar, M. (2015). su historia conceptu...

Traditional articles, books, chapters, conferences and seminars give way to new tools for disseminating scientific knowledge such as social media, betting on the concept of open science. This study was born from this context, which aims to recognize scientific issues in trends proposed by young Youtubers dedicated to the dissemination of science.



References

- [1] Streit-Bianchi, M., Michelini, M., Bonivento, W., & Tuveri, M. (2023). New challenges and opportunities in physics Education. Springer Nature.
 - [2] Vizcaíno-Verdú, A., De-Casas-Moreno, P., & Contreras-Pulido, P. (2020). Divulgación científica en YouTube y su credibilidad para docentes universitarios. Educación XX1, 23(2). <https://doi.org/10.5944/educxx1.25750>.
 - [3] Francescutti, P. (2018). Comunicación de la ciencia. Mucho más que explicar la física cuántica a las ancianitas. In Mediaciones De La Comunicación, 13(2), 15. <https://doi.org/10.18861/ic.2018.13.2.2861>.
 - [4] Faúndez, C. A., Rojas, Y. G., Pinto, A. A., & Astudillo, H. F. (2015). Taller de física cuántica: un método para introducir conceptos fundamentales en una actividad extracurricular. Formación Univ
 - [5] Alcía, su h
- This explores the evolution of scientific communication beyond the traditional model of scientists transmitting information to journalists and the public. It highlights changes in the roles of stakeholders, including the rise of private corporations, ONGs, and active social media users. The analysis also addresses challenges in scientific dissemination today, emphasizing the need for public engagement and a more democratic, interactive communication approach.



References

- [1] Streit-Bianchi, This paper proposes a constructivist methodology for active student learning aimed at significant learning in quantum challenges and opportunities in
- [2] Vizcaíno-Verdú physics. Designed for an extracurricular workshop aligned with Chile's Ministry of Education standards, it includes divulgación científica en YouTube y (2).
<https://doi.org/10.18861/ic.2018.13.2.2861>
- [3] Francescutti, P. la física cuántica a las ancianitas. <https://doi.org/10.18861/ic.2018.13.2.2861>.
- [4] Faúndez, C. A., Rojas, Y. G., Pinto, A. A., & Astudillo, H. F. (2015). Taller de física cuántica: un método para introducir conceptos fundamentales en una actividad extracurricular. *Formación Universitaria*, 8(2), 53–62. <https://doi.org/10.4067/s0718-50062015000200008>.
- [5] Alcívar, M. (2015). Comunicación pública de la ciencia y la tecnología: una aproximación crítica a su historia conceptual. *Arbor*, 191(773), a242. <https://doi.org/10.3989/arbor.2015.773n3012>.



References

- [1] Streit-Bianchi, The paper reviews the conceptual history of public communication of science and technology (PCST) and its challenges and opportunities in the digital age.
- [2] Vizcaíno-Verdú, three main communication models. It identifies three interrelated factors influencing these models: (1) changes in scientific practices and communication; (2) diverse stakeholders in scientific knowledge production; and (3) varying audience perceptions. Investigación científica (2).
- [3] Francescutti, P. (2018). La física cuántica a las ancianitas. *Investigación científica*, 2(2), 2861. <https://doi.org/10.18861/ic.2018.13.2.2861>.
- [4] Faúndez, C. A., Rojas, Y. G., Pinto, A. A., & Astudillo, H. F. (2015). Taller de física cuántica: un método para introducir conceptos fundamentales en una actividad extracurricular. *Formación Universitaria*, 8(2), 53–62. <https://doi.org/10.4067/s0718-50062015000200008>.
- [5] Alcívar, M. (2015). Comunicación pública de la ciencia y la tecnología: una aproximación crítica a su historia conceptual. *Arbor*, 191(773), a242. <https://doi.org/10.3989/arbor.2015.773n3012>.



References

- [1] Streit-Bianchi, M., Michelini, M., Bonivento, W., & Tuveri, M. (2023). New challenges and opportunities in physics Education. Springer Nature.
- [2] Vizcaíno-Verdú, A., De-Casas-Moreno, P., & Contreras-Pulido, P. (2020). Divulgación científica en YouTube y su credibilidad para docentes universitarios. *Educación XX1*, 23(2). <https://doi.org/10.5944/educxx1.25750>.
- [3] Francescutti, P. (2018). Comunicación de la ciencia. Mucho más que explicar la física cuántica a las ancianitas. *InMediaciones De La Comunicación*, 13(2), 15. <https://doi.org/10.18861/ic.2018.13.2.2861>.
- [4] Faúndez, C. A., Rojas, Y. G., Pinto, A. A., & Astudillo, H. F. (2015). Taller de física cuántica: un método para introducir conceptos fundamentales en una actividad extracurricular. *Formación Universitaria*, 8(2), 53–62. <https://doi.org/10.4067/s0718-50062015000200008>.
- [5] Alcívar, M. (2015). Comunicación pública de la ciencia y la tecnología: una aproximación crítica a su historia conceptual. *Arbor*, 191(773), a242. <https://doi.org/10.3989/arbor.2015.773n3012>.



State of art

The dissemination of quantum sciences is gaining significant momentum, particularly as the United Nations has declared 2025 the International Year of Quantum Science and Technology (IYQST).



INTERNATIONAL YEAR OF
Quantum Science
and Technology

This initiative aims to enhance global awareness of the importance of quantum science for sustainable development and technological innovation. It highlights the critical role that quantum mechanics has played in shaping modern technology, including transistors, lasers, and medical devices.

Various scientific societies, including the American Physical Society, are partnering to create programs that will promote quantum education and public engagement.



Shaping the science of tomorrow through the International Year of Quantum Science and Technology (IYQST)

Carles Alcaide i Blaya

Master in Advanced Catalysis and Molecular Modelling
Faculty of Science
Uniersitat de Girona

October 25, 2024

