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From Diverse Perspectives to Unified Strategies: European University Alliances and the Development of Adaptable Science Communication Concepts

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Abstract: Communicating scientific subjects to non-academic, non-specialist, or very young audiences using various event formats (lecture series, panel discussions, science slams, Children's Universities, Citizen Universities, etc.) is a key aspect of science communication. In the EURECA-PRO University Alliance, the implementation of these kinds of formats will be given greater focus at all institutions to make significant topics accessible in ways that go beyond the institutional walls of the universities.
To this end, approaches are being developed and tested to identify and reduce existing hurdles for the public. At the same time, in an international structure such as EURECA-PRO, it is essential to know individual frameworks to ensure that measures promoting a uniform strategy can be implemented by everyone.
In order to develop adaptable strategies for universities with different thematic focuses and locations in Europe, certain conditions for success must be identified and considered. In addition to the needs and resources of target groups, the requirements, and opportunities of the universities—as dictated by their respective circumstances—must also be considered. Using the examples of the EURECA-PRO partners Technical University of Crete in Chania (TUC), Silesian University of Technology in Gliwice (SUT), and Montanuniversität Leoben (MUL), challenges and results will be discussed.

Keywords: European University Alliance, Science communication, Third Mission, RE-EURECA-PRO, EURECA-PRO, Guidelines, Conditions for success

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Von unterschiedlichen Perspektiven zu einheitlichen Strategien: Europäische Hochschulallianzen und die Entwicklung anpassungsfähiger Konzepte für die Wissenschaftskommunikation

Zusammenfassung: Die Vermittlung von wissenschaftlichen Inhalten mittels verschiedener Veranstaltungsformate (Ringvorlesungen, Podiumsdiskussionen, Science Slams, Kinder-Unis, Bürger-Unis etc.) an ein nicht-akademisches, fachfremdes bzw. sehr junges Publikum ist ein zentraler Aspekt der Wissenschaftskommunikation. Die Durchführung von Formaten dieser Art ist an allen Standorten der Hochschulallianz EURECA-PRO ein wichtiger Auftrag, um relevante Themen über die Grenzen der Hochschulen hinaus zugänglich zu machen.
Hierfür werden Vorgehensweisen entwickelt und erprobt, um bestehende Hürden, die sich für das Publikum ergeben zu identifizieren und zu verringern. Auf dem Weg zu einer einheitlichen Strategie in einem internationalen Gefüge wie EURECA-PRO, ist es essenziell die Maßnahmen für alle umsetzbar zu gestalten.
Um anpassbare Strategien für die jeweiligen Universitäten mit unterschiedlichen thematischen Schwerpunkten und Standorten in Europa zu entwickeln, müssen bestimmte Gelingensbedingungen identifiziert und berücksichtigt werden. Nicht nur die Bedürfnisse und Ressourcen von Zielgruppen spielen hierbei eine Rolle, sondern auch Anforderungen sowie Möglichkeiten der Institutionen, die sich aus verschiedenen Rahmenbedingungen ergeben. An den Beispielen der EURECA-PRO-Partner Technische Universität Kreta in Chania (TUC), Schlesische Technische Universität Gliwice (SUT) und Montanuniversität Leoben (MUL) werden Herausforderungen und Ergebnisse diskutiert.

Schlüsselwörter: Europäischen Hochschulallianz, Wissenschaftskommunikation, Dritte Mission, RE-EURECA-PRO, EURECA-PRO, Leitlinien, Gelingensbedingungen

1. Introduction

In order to counteract the increasing problem of polarization and the rise of fake news in the public sphere and society [1] and to strengthen resilience in the population, the exchange of knowledge and research results with a non-specialist and/or non-academic audience is of crucial importance. Politics and the civil sector must foster awareness for science and research to consciously fulfill their social responsibilities. Particularly in a time of anti-science sentiment, the link between science and other areas of society needs to be strengthened. Furthermore, constructive, reasonable debate needs clear guidelines and boundaries that science alone cannot set.

RE-EURECA-PRO, the research arm of the European University Alliance EURECA-PRO, addresses the need to develop innovative approaches to science communication at the Alliance partners' campuses. This contribution discusses the central question of how we can design adaptable strategies from multiple perspectives for science communication within the Higher Education Alliance. In particular, we focus on how to design a flexible concept that can be adapted to the different conditions, circumstances, and needs of the partner institutions. The challenge is to find a common language that reflects the diversity of the member institutions and at the same time enables accessible and effective science communication.

Each university differs in various aspects, such as its geographical location and the cultural and legal national context, which can have both favorable and restrictive effects. A comparison or even the development of uniform and generally valid procedures is therefore only possible if a framework is created on the basis of the identified conditions for success and the consideration of other parameters, in which all partners and their respective initial situations are adequately represented. For this reason, the following article will first define conditions of success for science communication, as identified from a discussion of scholarly literature. In a second step, a questionnaire presented to three EURECA-PRO partners and its results will be discussed. This will provide a comparison of the frame conditions of these partners, which is the first step towards a common strategy.

2. Defining Science Communication and its Conditions for Success

Science communication is the dissemination of scientific content to a non-scientific audience by facilitating access to scholarly or complex topics through various event formats [2]. The focus here is particularly on social participation and civic engagement. In the context of the RE-EURECA-PRO project, these include science slams, Children's Universities, lecture series, and project weeks with schoolchildren. There are a variety of conditions which make the communication of science topics successful. A literature review was therefore used to identify these factors.

2.1 Factor Target Group

In order to make science communication successful, it is essential that the communication formats are specifically geared towards the target group. Possible target groups can be children, senior citizens, schoolchildren, or citizens of rural areas [6]. The topics and communication channels must be adapted to the diverse needs and interests of different target groups. Easy access and in-depth background information on the topics should be taken into account without losing substance [2]. Another important point for the selection of content and format is the objective of the communication (e.g. education, informing and engaging citizens, strengthening the bond between citizens and the university). The so-called "persona method" can be used to tailor content to a specific target group [3]. Here, the target group and its core characteristics are represented by a fictitious person who is used by the science communicator in the conception and concrete design of the offers. By doing so, scientists can put themselves in the position of the target group and better understand which topics and formats suit it best [3].

2.2 Factor Science Communication as an Instrument for Profile Building

Research institutions are responsible for the strategic orientation of science communication, which plays a decisive role in profile building [1, 7]. The organization-specific focus of science communication should be given high priority and incentives should be created for scientists to actively participate in communication [2]. Such a profile can internally create a common identity for scientists at a research institution and provide a visible, unique characteristic for the outside world.

2.3 Factor Qualification of Communicators

In order to reach a broader audience outside the scientific community, it is important that scientists are provided with opportunities to improve their communication skills [9, 11]. Qualification is necessary for two main reasons. First, scientists are trained to process information rationally and draw conclusions on an empirical basis [9]. This often leads to the misconception that the public is able to process information in a similar way. Secondly, many STEM disciplines lack formal training in public communication [9]. Media literacy proves to be a crucial prerequisite for successful science communication [2], as the target audience should be addressed via media that they prefer to use.

2.4 Structural Support Factor

Strengthening the status and perception of science communication by university management and within the university alliance is of great importance [7]. Successful science communication requires established structures at the communicating institution, including digital platforms, media centers, and networks that serve as effective communication channels and infrastructure [2].

2.5 Factor Changing Dynamics of Science Communication

Science communication has undergone profound changes in recent decades due to increasing digitalization. These changes are linked to comprehensive changes in society, the media, and science itself [4]. As a consequence of the dynamic developments due to pandemics, wars, and political upheavals, there is a growing need for reliable information to ensure responsible and democratic societies. It is therefore important to also consider the social responsibility of communicators when selecting success factors.

2.6 Factor Constructive Evaluation

Evaluation is used to measure the success or failure of the science communication formats implemented and therefore requires a clear definition of objectives. They need to be formulated in such a way that the degree of their success can be observed or measured [8]. The evaluation of science communication should be subject to a predetermined methodology and be seen as an ongoing learning process [10]. Openness, transparency, and a willingness to learn from mistakes and share findings are key elements of success [5].

3. Survey: Methodology and Results

At the beginning of strategy development as part of work within RE-EURECA-PRO, a survey was carried out among the partners which was specifically designed to address the relevant topics of the work package focused on Citizen Engagement and Societal Knowledge. This survey was carried out again in an adapted form with eight free-text questions sent to three partner universities: the Technical University of Crete (TUC), Montanuniversität Leoben (MUL), and Silesian University of Technology (SUT), in order to collect specific data in the context of this article.

The three-part survey addresses the underlying views regarding the university's own definition of science communication and the resulting target groups and thematic focuses. Furthermore, existing structures and resources, including those resulting from (geographical) location and other environmental factors, are examined. The third part of the survey asks about expectations in relation to goals and requirements as well as future expectations for the implementation of science communication events.

As a result of the responses to the survey, it can be stated that there is a consensus on fundamental aspects such as the general understanding of science communication and its objectives. However, a detailed assessment, particularly regarding individual experiences and priorities, reveals differences that call for appropriate approaches. In the following, the answers of the three universities are summarized under each of the survey's questions:

3.1 Science Communication Has Many Facets. How Would You Define This Term?

The definitions of science communication differ among the universities with regard to internal and external communication. TUC uniquely mentions the importance of communicating within the scientific environment (inside communication), while MUL and SUT focus more on external communication to society or broader audiences.

Similarities in the recognition of science communication's importance can be found. The goal of reaching a broader audience while keeping the hurdles low and maintaining accessibility was mentioned in particular. Furthermore, differences in the design of the communication channels (social media, print, newsletters, etc.) were mentioned. Only MUL provides a detailed breakdown of different communication channels, including scientific journals, the general press, and social media.

3.2 What Basic Mission Do You Think Science Communication Should Fulfill?

The basic mission of science communication is directly connected to its definition. All three partner universities emphasize the importance of reaching a broad audience and the mission of transferring the message of what science is about and its significance to society. MUL and SUT already set a thematic focus when defining the mission and stress the importance of creating STEM awareness.

While the basic pillars of the tasks of science communication are similar among the partners, further variations can be identified. On the one hand, this concerns the range of goals pursued. MUL provides a more detailed breakdown including aims, such as countering skepticism, establishing technology as a solution, and improving the overall image of STEM. On the other hand, SUT sets a strong emphasis on the educational aspects of science communication, including teaching, increasing the need for critical thinking, and fact-checking.

3.3 Which Specific Target Groups Should be Focused on in Your View?

All partners emphasize the inclusion of a broad target group, stating that it depends on the aim of the communication and can therefore include all ages. TUC and MUL pay particular attention to the importance of targeting young people. The universities differ in the basic

approach of how the target group is addressed. For example, TUC divides its target group into smaller sub-groups and provides a detailed breakdown of educational levels, including elementary and secondary school pupils, as well as students in higher education. While MUL provides specific details about targeting different generations through distinct media channels, SUT follows an aim-dependent approach, in which the target groups depend on the aim of the communication.

3.4 To What Extent Has Membership of the University Alliance EURECA-PRO Influenced the Science Communication Formats and General Understanding of Science Communication at Your Institution?

According to the partner universities, the alliance fostered interaction but also points of friction between different levels of knowledge of science, so that new ways of communicating science to people were promoted accordingly. TUC and SUT both mentioned that the activities and projects influenced by the alliance had a positive impact on engaging different audiences. In addition to conventional approaches, they actively explored new forms of science communication, such as scientific stand-up performances and the use of game boards. This has increased the visibility of the Silesian University of Technology as a scientific institution. To provide another example, TUC highlights a variety of activities fostered by the alliance, such as hybrid training workshops, scientific open house, events on innovation, and encouraging interaction between researchers. In a similar vein, MUL focuses on specific projects like Future Days and Children's University energy workshops.

3.5 Have You Already Organized Science Communication Events (Both Scenarios within the Alliance as well as Outside the Framework of EURECA-PRO)? If Yes: What Format?

All three universities have organized science communication events within the framework of EURECA-PRO. TUC offered a week-long project, where all students from Greek universities were able to participate (project week). MUL mentioned projects such as Long Night of Research and MINT Congress, a three-day conference which brings together teachers and head teachers of all school types and levels, business representatives, and scientists and researchers related to the education sector. SUT has, for example, a competition called Three Minute Thesis®, which is a concept originally developed by the University of Queensland in which PhD students present their doctoral theses in three minutes in a science-communicative way.

3.6 What Challenges Have You Identified While Implementing Science Communication Events?

When implementing the formats, communication challenges were particularly visible. TUC and SUT both stress the need to reach students through specific channels, for example through the students' e-class notification services. However, the partners also identified differences in the perceived challenges. While TUC focuses on the problem of effectively promoting science communication events to university students, MUL emphasizes the necessity to convince all stakeholders involved of the importance of science communication initiatives. SUT highlights challenges related to the organization of too many small events overall so that the audience is forced to choose between too many events. Additionally, scientists must be convinced to invest extra time for science communication events outside of teaching and research.

3.7 Which Specific Social and Geographical Conditions of Your University Have an Influence on How You Handle Science Communication?

Both TUC and MUL acknowledge the influence of the geographical location of their universities on science communication. TUC discusses the focus on the target group, as the Technical University of Crete's campus is located five kilometers from the town center. Furthermore, the location of TUC on an island in a provincial area and small community facilitates word-of-mouth recommendation. MUL notes the strong interaction with the municipality due to the university's location in the middle of the city of Leoben as well as the limitation of their communication to technical topics. SUT emphasizes the interdisciplinary and diverse nature of scientific topics at their university. Moreover, they have facilities for educating researchers for science communication.

3.8 What are Your University's Future Goals Regarding Science Communication?

For future implementation of science communication TUC and SUT mention the intention to explore or improve collaborations. SUT indicates a focus on improving communication and event planning as well as offering classes in science communication free of charge. TUC outlines a specific plan to establish regular science communication events at a feasible pace through which the local community gets to know the work, modes of operation, and achievements of the university. Moreover, they would like to learn from past experiences and improve the events, their content, and implementation. MUL includes specific goals related to the measurement and presentation of communication efforts by defining Key Performance Indicators (KPIs) for success. SUT introduces a financial aspect, expressing a goal to gain money for performing science communication.

4. Conclusion: Designing Adaptable Strategies and Formats

When developing adaptable strategies, the general conditions for success identified in the literature review and the requirements of the universities must be combined. Strategies must be designed in such a way that formats are manageable and scalable for all partners and at the same time serve to achieve the goals set individually. The results of the survey show that successful science communication strongly depends on framework conditions such as the education of scientists and the awareness that science communication is a tool to promote the status of the institution to the public.

This affirms that the perception of science communication as an instrument for profile building is a factor of success for the European institutions in the EURECA-PRO network. Moreover, cooperation in the alliance inspired some universities to try new formats as well as to increase their activities in this field. The other institutions in the alliance functioned as "sparring partners" or peer advisors for science communication, enabling and encouraging exchange and development. This may be a new factor of success we can identify within the EURECA-PRO network. Experiencing self-efficacy in communication efforts and daily work life is closely linked to increased motivation on the part of the researchers.

The important influence of geographical location is mentioned by all three universities as this both helps and limits the way target groups can be addressed. Local communities are strong facilitators which should be used to advertise formats and events (word-of-mouth marketing).

To do justice to all factors, it is necessary to compare them to the defined conditions for success already in the strategy-development phase. One solution for a unified strategy is the establishment of modular procedures within a predefined framework. This was (partly) done for the partner universities in EURECA-PRO. The Mittweida University of Applied Sciences team provided a guideline document for every format tested to ensure the quantity and quality of science communication. This included, for example, materials for the planning and execution of a project week for schoolchildren with the topic of sustainability, concerning the organizational time frame, technical essentials, number of lectures for professional input sessions, a model survey for evaluation, and proposals for different modes of realization depending on the resources of each institution.

A valid and reliable evaluation of all formats and events is extremely important. Constructive evaluation forms have to be standardized and objectives set in general terms, so that the results remain comparable despite the different designs. Evaluations have to take local differences into account (native language of the citizens) and must use simple language.

While these first results are encouraging, more work needs to be done especially in terms of intercultural, social, and disciplinary differences in science communication within the EURECA-PRO framework. How do intercultural aspects influence conditions of success for science communication? Which roles do social factors and the disciplinary boundaries of a given topic (e.g., natural sciences, social sciences, economics) play? This will be the task for the Mittweida team in the next phase of RE-EURECA-PRO.

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