(Re-)establishing European Universities Role in Society: The case of EUt+

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ABSTRACT: *Although the significance of social impact in science communication is broadly understood and acknowledged among academics, science communication practices of many universities are still inefficient and fail in their mission to raise awareness among young people and engage broader society. The aim of the present paper is to investigate the current science communication practices in place at technical and technological universities in Europe, and, through eight case studies and an in-depth comparative analysis, to provide a working solution that will facilitate the promotion of European research through universities' use of appropriate skills, media, activities and dialogue.*

Keywords: Popularization of science and technology, public understanding of science and technology, representations of science and technology

Introduction

Over recent decades, it has been widely acknowledged that science, research and technologies have made notable economic and social impact on modern societies. Science to the benefit of people and society is, undoubtedly, a crucial factor to European Union growth and well-being. However, despite the significant number of research-based studies (Borssard, 2013; Jucan and Jucan, 2014) and evidence provided (c.f. Brossard, 2013), the role of universities and the promotion of the research carried out by them is still insufficiently understood by broader society. Why should we care about the specific role universities play in these processes of interaction between research and an unspecialized "lay" audience? The answer to this question is twofold: on one level this will help universities achieve much better recognition and raise interest among a younger audience of future students, as well as helping provoke an interest in and passion for science and research, motivating students to pursue a research career; but on another level – it can also help universities achieve much better recognition and help them position themselves among other economically and socially important actors, such as businesses, policy makers and socially responsible non-governmental organisations. Quite

often the importance of the work done at universities, especially in the European context, is underestimated and neglected. They are frequently criticized by some areas of the media or by angry, ill-informed citizens, as well as by some private or non-government organisations for not providing the adequate quality and knowledge or skills needed in a modern world. Sometimes they are even considered too academic, aloof ivory towers, outdated, and divorced from the practical needs of society, too theoretical and not relevant to business needs. Sadly, this is often widely communicated across various channels, without being particularly true (Ross, 2018).

The authors believe it is time for European universities to re-establish their role in society in three complementary aspects. First and foremost, more than ever, universities play a fundamental role in providing modern economies with human capital, which still is and always will be crucial to economic development notwithstanding the increasing role of Artificial Intelligence (AI). Secondly, universities have an active role to play in the creation of new knowledge and technological innovations applied in industry. Last, but not least, they are a source of evidence-based research findings that benefit policy making. Undoubtedly, through these three roles, universities contribute significantly to the economic development and well-being of people and societies.

The aim of the present study is to investigate the current science communication practices in place at technical and technological universities in Europe, based on eight case studies and in-depth comparative analysis and to provide a working solution that will facilitate the process of promotion of European research through universities' use of the appropriate skills, media, activities and dialogue.

The organisation of paper is as follows. First the development of science communication as a concept is reviewed from the perspective of finding suitable strategies and a model that can improve universities' science communication efforts. The next section details the research methods which are present through observation, eight case studies and a survey. In the following sections are offered research findings about current science communication practices, a methodology of a communication approach and conclusions.

Science Communication

Understanding and interpretation of the concept of science communication varies (Lewenstein, 2003; Lewenstein, 2022). Some scholars (Brossard, 2013; Bryant, 2002; Bryant and Pribanic-Smith, 2009; Miller, 1998) consider this to be a translation exercise carried out by mainstream media communication professionals whose goal is to make complex scientific findings accessible to a general audience. However, others focus more on activities encouraging and empowering public participation through citizens labs, science shops, deliberative polling and other techniques (Joss, 1999; Wachelder, 2003). As Lewenstein concludes in his 20 years overview of what it is all about '"*science communication" is not one thing, and that not everyone in it has the same goals (Lewenstein, 2022, p. 3).* Irrespective of this on-going debate, the importance of science communication has turned into a separate research field with a specific

place and role in the research domain. As Burns et al. (2003) rightfully acknowledge, science communication is not simply encouraging scientists to talk more about their work, nor is it an offshoot of the discipline of communications.

Illingworth and Allen (2020) view science communication from the perspective of both scientific and social impact. Following that approach, they consider it comprises two aspects: one which is aimed at engaging scientists (inward-facing), through peer-reviewed publications, grant proposals, and conference presentations, etc. and another which is aimed at engaging non-scientists (outward-facing), which involves working with non-scientists, to both communicate research output more widely and to help diversify and broaden scientific discourse.

Gibbons et al. (1994), in a similar way, distinguish two different approaches of research: focusing on scientific impact, characterised by academic interest and needs ("Mode 1"), or on social impact ("Mode 2"). The studies dedicated to the second approach use various names, such as: *third stream activities*, *societal benefits*, *societal quality*, *usefulness*, *public values*, *knowledge transfer*, and *societal relevance*. Building on that and on Bryant's (2002) short, but comprehensive and highly informative definition of science communications as *"the process by which the culture and knowledge of science are absorbed into the culture of the wider community"*, Burns et al. (2003) come to a clearer definition of this broad and quite often misunderstood or misinterpreted concept, called the "*AEIOU definition* of science communication".

- ***A****wareness*, including familiarity with new aspects of science;
- ***E****njoyment* or other affective responses e.g., appreciating science as entertainment or art;
- ***I****nterest*, as evidenced by voluntary involvement with science or its communication;
- ***O****pinions,* the forming, reforming, or confirming of science-related attitudes;
- ***U****nderstanding* of science, its content, processes, and social factors.

Finally, they summarise that science communication may involve science practitioners, mediators, and other members of the general public, either peer-to-peer or between groups (Burns et al., 2003).

In their definition, which in practice looks more like a model for science communication, they try to unite all participants, features, channels, actions and results of the process. The main strength of this extended definition is that it tries to clarify the goal and the nature of science communication, thus providing a basis for evaluating its effectiveness. Authors suggest that science communication is about the use of appropriate skills, media, activities and dialogue to produce one or more responses to science. They consider the *AEIOU definition* of science communication is an effective approach and should be applied in the planning of a communications strategy.

Equally important is the communication media, which has changed dramatically in recent decades. In today's world, more than ever, universities and other academic institutions have an

opportunity to contact both scientists and non-scientists directly. In practice, through the various kinds of digital platforms and social media, they can engage with students, researchers and the broader society. Furthermore, they may discuss scientific findings outside their specific spheres online, without intermediaries (Brossard, 2013; Colson, 2011). However, what is even more important and should be acknowledged, and considered in any communication strategy is the fact that in today's world the media environment continues to change dynamically.

Further, considering the *Office of Science and Technology and Welcome Trust* 2000 report present authors acknowledge there is a clear stature and understanding of communication flows between various groups. In the report entitled *"Science communication and public attitudes to science in Britain"* the main communicating groups are rightly outlined:

- Groups within the scientific community, including those in academia and industry;
- The scientific community and the media;
- The scientific community and the public;
- The scientific community and government, or others in position of power and/or authority;
- The scientific community and government, or others who influence policy;
- Industry and the public;
- The media (including museums and science centres) and the public;
- The government and the public.

It is the present authors' assertion that through more active science communication, universities can not only re-establish their role and increase public trust in science, but they can, also gain greater recognition for the part they play in solving important contemporary challenges associated with social media, such as: fighting against mis- and disinformation and political polarisation; engage non-experts in scientific research processes and promoting scientific literacy; helping to shape a healthier approach to socio-political discourse; contributing to science-based policymaking (especially related to topical issues such as climate change, AI, healthcare, environmental protection etc.); and, last and not least, contributing to the inclusion of marginalized groups.

However, further exploration of the science communication literature reveals more recent debate on the way in which science communication considers topics: the training of scientists in communication (Besley and Tanner, 2011); exploring the societal factors which have led to an increased need for scientists to communicate; the various cultural influences and key motivations surrounding different types of science communication; the advantages and disadvantages of the three main media formats – traditional journalism, life or face-to-face events, and online interactions (Bultitude, 2011); the interaction between science and society (Jucan and Jucan, 2014); the aims of science communication and its actual impact (Kappel and Holmen, 2019); science communication as an instrument to fight against misinformation (Goldstein et al. 2020); science communication and public trust in science (Intemann, 2023); science communication in the age of artificial intelligence (Schäfer, 2023).

Building on these views and in line with the goal set to outline strategies that can be developed to improve universities' science communication efforts across Europe, the authors of this paper will search for answers to the following questions:

- What types of scientific and research content are most commonly communicated by EUt+ universities to non-scientists audiences?
- Who are the key decision-makers in the science communication processes within EUt+ universities, and what procedures govern these decisions?
- Through which channels and media do EUt+ partner universities disseminate scientific information excluding academic platforms?
- What are the common formats and frequencies of science communication practices across the EUt+ Alliance partners?
- What challenges and limitations do EUt+ Alliance partner universities face in effectively promoting research to the stakeholders and to the board audience?
- What innovative approaches and new ideas could be implemented to enhance the visibility and impact of science communication in the EUt+ Alliance?

The present authors believe that the communication approach for promoting European research (science and technology) must align with the following well-known coherent actions:

Define the type of the research-related content to be communicated

The research can be promoted in a number of ways, starting from the most obvious cutting edge research results, through topical social and economic issues to less obvious, but equally important and illuminating day to day experiences of researchers; life in research labs; students' first steps in research and many other less familiar facts related to what constitutes modern research life. In order to specify the content to be promoted, we need to address the question – *What type of information to communicate?*

Specify the target audience

In pursuit of the goal set, to raise awareness across society, particular target groups needed to be identified in order to focus the research communication. Each one of them will demand a different approach and different communication channels. For the various target groups, the format and the messages might be quite different. Therefore, in answering the question – *Who are the target audiences* – the following broad groups can be identified:

- Students;
- Business (managerial staff);
- Academics (researches and lecturers);
- Non-field experts;
- Field experts – researchers.

Based on the *AEIOU definition* the present authors have identified various communicational needs depending on the specifics of the target group (Table 1). This does not mean that the

science communication for this groups is just limited to these characteristics, but is meant to give general guidance regarding the specific of the communicational style and goal.

Table 1

Impact of AEIOU definition categories on various target groups

Target Audience	***A**wareness*	***E**njoyment*	***I**nterest*	***O**pinions*	***U**nderstanding*
Students	**X**	**X**	**X**		
Business	**X**			**X**	**X**
Academica				**X**	**X**
Non-field experts	**X**		**X**		**X**
Field experts		**X**	**X**	**X**	

Building on *AEIOU definition* (Burns et al., 2003) and former research (Taddicken and Reif, 2020) the present authors consider adding one more category, namely – *emotions*, as, it is through positive emotions people develop attachment and keep their interest alive. Considering the target groups, presented in the table the newly introduced category of emotions will impact, being it directly or indirectly.

Methods

The explorative study of the current state of science communication practices in place at EU universities is based on eight case studies, representative of various technical or technological universities in Europe, united in the newly formed alliance of the European University of Technology. The research design has been chosen as it is concerned with the complexity and particular nature of the question studied (Stake, 1995). It will facilitate the present investigation, providing opportunities to view the subject under study through various perspectives and angles. The present authors propose them as a working example, since these universities are representative of the various kinds of member-states and academic institutions. We have four widening countries – Bulgaria, Cyprus, Latvia, and Romania, and four older EU member states – France, Germany, Ireland, and Spain. Among partner academic institutions, there are classical universities with a longer history (over 80 years) – Riga Technical University; Technical University of Sofia; Technical University of Cluj-Napoca, and younger and modern universities (less than 30 years) – Cyprus University of Technology; Technological University of Dublin; University of Technology of Troyes; Technical University of Cartagena; Darmstadt University of Applied Sciences. All the universities under study are defined as universities of technology, with a strong focus on research impact, through applied research and technology transfer.

In order to get an overall picture of current science communication practices, a survey, based on the presented above research questions (Annex 1), has been carried out among all EUt+ partner universities, followed by an examination of the universities' websites, social media and other communication documents and publications. The results from the survey have been summarised, benchmarked and analysed by a research team formed from all eight case study universities. The benchmarking report (Annex 2) provides a commentary of general and specific approaches, and has led to the formulation of relevant proposals for further joint development of the EUt+ Alliance research communications processes.

The overarching aim of this approach is to provide a working solution based on existing practices in place, previous experiences and solutions, as well as some insights from earlier research. This will facilitate the process of promotion of European science and technology among the wider society, involving local communities by interconnecting its regions on a European scale and involving stakeholders in the research and innovation process. Europe is lagging behind the USA and UK in terms of promoting and communicating more broadly its science, technology and research achievements.

As a narrower and more specific goal, the research also focused on the need to position the EUt+ Alliance as a reliable, socially responsible university alliance, where research is based on core European values and culture, where innovation and new technologies are developed with the clear vision that people, society and their needs, well-being and future are of utmost importance.

All eight case study universities took part in a survey to assess the current communication practices with respect to research and its outputs across the EUt+ Alliance. Themes, chosen for the present analysis, were identified and then categorised in accordance with the university-based science communication theoretical model developed by the authors (Fig. 1)., namely:

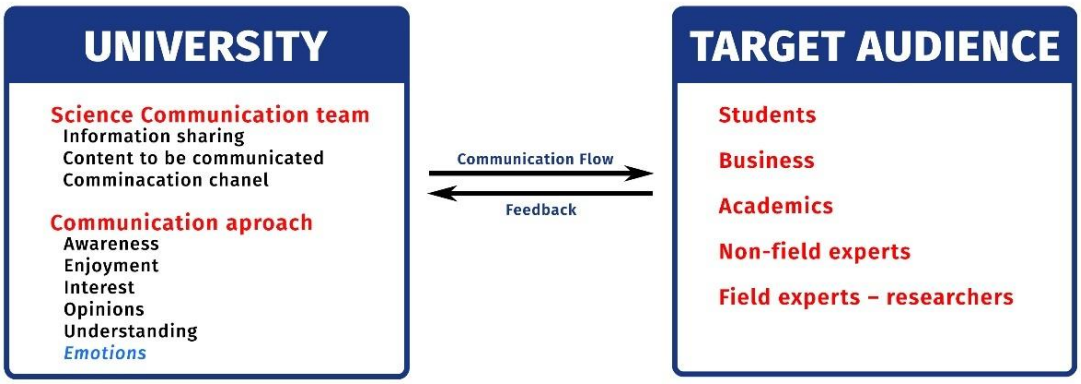

Fig. 1 University-based Science Communication Model

Current Science Communication Practices

Following the overarching aim of EUt+ alliance to represent Europe's diversity in a way that is as balanced as possible in terms of people, cultures, and languages, together with EUt+ specificity in terms of research impact, we present briefly each one of the partner universities (Annex 3). All of them are united by the vision that research and education are tightly aligned. They share a common belief that through the excellent, mostly applied research carried out, EUt+ Alliance provides high quality education and trains students, who can apply their knowledge and skills anywhere in Europe. EUt+ aims to produce the European Engineers of a new generation, "emerging leaders" of technological change, who are able to "drive" ethical and responsible innovation processes in order to co-create value.

In order to get an overall picture of the current science communication practices, a survey, among all EUt+ partner universities, has been carried out (Annex 1). The results from the survey have been summarised, benchmarked and analysed. The benchmarking report (Annex 2) provides information and comparative analysis of general and specific approaches, which have led to the formulation of an Action Plan for further joint development of the EUt+ Alliance research communications process.

Research outputs across the EUt+ Alliance are generally disseminated in peer reviewed journal articles and texts, which can be mostly reached via open access as determined by the publisher. The audiences for such outputs are normally academics, external specialists or interest groups and others who often have some knowledge of the area. A small number of the partner universities disseminate their research outputs via art works, performance materials, compositions, performances, films, documentaries, reports, and white papers etc., which by their nature are mostly publicly available. This is more common for outputs across the arts, humanities, social sciences, and business areas. However, it is the communication of research by other means to external potential users of the research, i.e. non-specialist stakeholders, citizens, and the media, which is the focus of this benchmarking study.

Content that is communicated

There is general agreement among the partner universities as to what content is communicated externally regarding research activities and outputs. These include: cutting edge research results; details of the main research fields /applied research outputs/ research findings implemented by companies; information about notable/ distinguished researchers; details of specialist or interesting laboratories and their equipment, along with profiles of research teams and their achievements. Some also communicate details of student and PhD research activities; and give details of company collaborations employed in co-created projects, along with associated spin-outs and start-ups emanating from research. One of the partners communicates on research through artistic activities.

Communication procedures and practices

While there is no centralized approach used overall, and little prioritization with respect to when and how content is screened, all partners who responded, have two common pathways: the researchers (Principal Investigators) send content to the centralized Communications Team *or* the Communication team seeks out/searches for content related to research from staff.

Additional approaches such as those listed below are also employed by one or two partners:

- Researchers place content on their LinkedIn or other social media platforms directly;
- Service Functions for Research and Knowledge Transfer Offices communicate content;
- More well recognized researchers are directly contacted by TV and radio and they are provided with assistance from the relevant Communications Team;
- Some research labs, research groups or individual researchers occasionally communicate topical information in news or TV platforms.

Other practices

Some general insights in terms of the breadth of activities across the alliance and analysis is provided below. One partner cites that their *communication team* does prioritize the release of content for social media, web or press releases. A similar approach is followed by another partner – however, the accent in this case is on the timing of publicity and the “packaging” (only press release and photo, or the production of a video etc. when there is enough visual material to do it etc.). Only one partner reports that the director of research and the director of communication decide whether certain research information is worth communicating to a broader audience. For the most part, there is no real prioritization and content is shared often as it comes into the team via daily news sections of the university website, or at times that are set by the *Communication team* or Research Service function who produce research news for magazines. On either end of the scale, one partner maintains that they have no regular research news feed to the external environment while another publishes three articles per month on their online research magazine, disseminates press releases twice a month, sends particular topics to journalists directly several times a year and holds press conferences about once a year. Most other partner activities regarding frequency and sharing of content lie somewhere in between. For the most part the communication teams in all partner sites facilitate sharing of content as they receive it, in a flexible manner.

Communications teams do seek information in advance of certain events from the research community and do publicize any research events scheduled to take place in their university once they are aware of them. In some partner universities there is a dedicated marketing resource within the Research Functional Areas, and they also actively seek information for sharing. This is not common practice, however.

Research content is shared and made visible on all the individual university websites, while the most prevalent social media platforms used are Facebook, LinkedIn, X (formerly Twitter), and

Instagram. Content is also shared with printed media, e.g. newspapers, and with TV, radio and at fairs, festivals, conferences and other events organised in their region, by having stands, public talks/demonstrations, and in one case, on rolling screens. Very few partners use Tik Tok. Other less commonly used media include the Open access digital repository ARROW that has global reach and citations and downloads can be tracked. Blogs are less well used, but they are used by researchers in a few partner universities. Almost half of the partners have their own University YouTube channel.

All partner sites reach out and share research content with the broader society in other ways as well. In the majority of cases, this takes place at pre-organized events and exhibitions. These events are organized by groups external to the university and are often chosen due to their relevance, often dictated by local and/or national focus, e.g. by theme or those focused on business and entrepreneurship. The most common events are Researchers' Nights; Museum Nights; and FameLab. A Summer School and Citizen Science are also mentioned. One university has a permanent exhibition space, while another hosts research performances and artistic, literary and historic exhibitions.

In summary, the EUt+ partners have mechanisms for sharing research results, activities and news, and a variety of ways of communicating research content with good commonality already. This is a good starting point for establishing a common pool of resources to inspire or draw from, common practices to scale up, and potentially a common EUt+ approach and practices going forward.

EUt+ Alliance Partners Proposals to Enhance Communication Processes

At the end of the Benchmarking survey, all EUt+ partners were consulted about what should be done in the future in order to achieve the goal set – to position the EUt+ Alliance as a reliable, socially responsible university alliance that is visible, acknowledged and appreciated among broader EU society. Some ideas that EUt+ partners think may be worthy of exploring:

- Set up a permanent exhibition;
- Have an EUt+ communication strategy and communication procedures;
- Establish EUt+ joint research communication office and form science communication joint teams;
- An engagement and impact EUt+ website;
- Greater EUt+ connectivity for events and reach to non-EUt+ community;
- More open events to showcase research to public, chambers of commerce and industry, local government offices and civic offices and regular TED talks, roadshows;
- Set up an EUt+ science media centre;
- Have more multimedia content with greater frequency and high-quality film formats, short videos targeting a younger audience via Instagram/Tik Tok with a young host of those videos who has received training;

- Video documentation of events and production of audio-visual material of professional quality;
- Production of social media friendly video promos;
- Podcast series with one per month;
- Have a yearly international research day with EUt+ partners;
- Organise regular science and research communications events, such as Café Scientifique, Science debates, round tables;
- Organise an annual international competition of best innovation projects;
- Develop science and research communications policies and procedures;
- Create a community – a critical mass of non-academic 'followers'/ EUt+ research fans;
- Encourage researchers to be more actively involved in science communication and promotion;
- Organise events targeted at civil society;
- Try to engage EU media to promote topical EUt+ research.

Based on the 8 case studies presented and on evidence of good practices and a methodology of a common communication approach has been developed.

Action Plan: Methodology of a communication approach

In order to be able to unite efforts of all EUt+ Alliance members and to establish a community engaged and really committed to European science communication, first and foremost we need to create teams of professionals in each of the partner universities. The experience of the first three years of collaboration shows that overall, the information flow is fragmented and not coherent enough. While all of the partners make dedicated efforts to promote their research achievements, the impact on broader society is still rather limited. Therefore, in this objective, we present the basis that has been co-constructed within the Alliance consortium that will be developed over the coming years. We need to bear in mind that this is a long-term process. The ultimate goal is to ***develop a feeling of common EUt+ identity***. This corresponds to the idea of creating a common European identity. The proposed methodology consists of several operational steps, described below.

First step: Science Communication Teams in each partner university

Each partner university would need to allocate at least 2 to 3 people engaged full time in communication of the life and research of their university. Ideally the team would include a PR specialist, journalist, professional photographer and camera operator. From the EUt+ communication perspective, their main task will be to share all news and important events that take place within their university with the rest of the EUt+ alliance members. Gradually these eight science communication teams should start working together jointly as members of one organisation. This work should be guided through a common science communication strategic vision and corresponding plans.

Second step: Create Regular Communication Flow

The idea is to create a suitable science communication environment, i.e., develop the ecosystem. This will require **two parallel streams of information flows that supplement each other**: *academic life* in general and *research related information*. Communication teams should feed in notable information about their university. This can include day-to-day / ordinary academic events, such as the launch of the academic year, students' contests, daily life of a young researcher at the university; research conferences and workshops. It may also include responses to news items from a research perspective, so that the universities themselves approach the news media rather than the other way around. The idea is to create regular information flow and critical mass. We need to start from somewhere. The creation of EUt+ joint research output will take time to build up, given that the EUt+ Research Institutes are only beginning to form and work on collaborative projects, and also generate outstanding notable and attractive inventions to supply a regular research information flow. However, regular information sharing is needed for community management. This will keep the interest alive and provoke interest. It can provide interesting facts that raise awareness and understanding among wider society.

Third step: Information sharing platform

The goal is that each one of the partners is better informed about the academic life of its partners. Gradually this will bring partners closer together and eventually establish the environment needed to become a united entity. Knowing more about each other will help to build trust and collaboration, until we establish an EUt+ community. A similar approach can potentially be applied at a European level on a broader scale.

Fourth step: Regular Meetings

Communication representatives should meet on-line on a regular basis at least once a month. Physical meetings are highly recommended and should be held at least twice a year. There should be a joint communication strategy and plan.

Fifth step: Determine the appropriate communication channel

As mentioned above, identifying the most appropriate media or communication channel for each one of the wider society target audiences is of critical importance. The most widely used media nowadays include, but are not limited to:

- Press – Popular journals; Newspaper columns; Popular books; both paper and online editions;
- Digital platforms – Social media platforms (such as Facebook, LinkedIn, X, Snapchat; Instagram, TikTok);
- Media sharing platforms (such as YouTube, Spotify, Vimeo);
- Knowledge platforms (such as Quora, Yahoo, etc.);
- Broadcasts – TV; Radio; Online – science dedicated programmes;
- University and other academic-related websites;

- Podcasts;
- Social events on a regular basis (monthly, yearly) – Science Fairs; Researchers' Night; Café Scientifique (monthly or bi-monthly); Round Tables (several times per year); Public debates;
- Performances and exhibitions; Science museums.

Conclusions

Following the presented Methodology of Communication Approach, the EUt+ Alliance member have established the EUt+ Ideas Institute think tank, and has successfully held public events in Riga, Sofia, Dublin and Darmstadt. In practice the activity of the think tank corresponds to the public engagement model (Lewenstein, 2003), where scientists, the public and policymakers participate equally in discussion and debates about issues in science and technology. The application of the methodology is an on-going, under-development process, part of which can be followed through the YouTube channel[1].

This approach will be gradually adopted by all EUt+ partners in order to frame Alliance science communication strategy. It will build around the key recommendations presented in the paper related to developing a feeling of common EUt+ identity; establishing and keeping regular communication flow (right balance between wow news and university daily life); and last, but not least, considering the specific needs, attitudes, and emotion triggers for various target groups.

The communication approach is transferable to all networks and institutions. With recent geopolitical events and the pressing climate emergency, more than ever, universities need to take on board their responsibilities as curators of knowledge within society. All higher education institutions (HEIs) must be proactive in feeding minds, not just of their students but of society as a whole.

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Acknowledgements

The work presented in the current study was undertaken in the framework of the IBA-SwafSSupport-2-2020 project "EUt EXTRAS: European University of Technology - Experimentation to Transform Research Activities and Steering" under the contract H2020-IBA-SwafS-Support-2-2020/101035812.

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