

The background features a large, abstract graphic design. It consists of several overlapping shapes: a large black circle at the top, a smaller pink circle below it, and a large, irregular black shape that resembles a stylized letter 'S' or a similar form, all set against a pink background.

Framework for courses in science communication

Framework for courses in science communication

Collaboration report

Conclusions and recommendations from a team of experts: Sara Arvidson, Magnus Boström, Christina Dahlgren, Jesper Falkheimer, Anna Maria Fleetwood, Armita Golkar, Anna Jonsson, Robert Lagerström, Elisabet Nihlfors, Jesper Olsson, Caroline Runéus, Andrea Spehar, Jonas Stier, Josefina Syssner

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Dnr 5.5-2020-06024

ISBN 978-91-88943-59-0

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Contents

Foreword	4
Summary	5
About the initiative and the report	7
Doctoral students need knowledge about and training in science communication.....	10
Reflections and recommendations.....	16
A framework for courses in science communication.....	24
A complex society places demands on both research and communication.....	44
Appendix 1: The expert team behind the framework	50
Appendix 2: Pilot course in science communication for doctoral students at Örebro University 2021/2022	52
Appendix 3: Dialogue meeting: “Let doctoral students communicate more!”	57
Appendix 4: What knowledge and training in communication can give a doctoral student	61
Appendix 5: Reading tips.....	62

Foreword

Science communication contributes to increasing the understanding and engagement by the general public and decision-makers in research and the scientific process. With this report, we want to provide inspiration for making science communication a more natural part of third cycle higher education. The report gives an overview of what science communication can be, and how it can be carried out effectively. The focus is on doctoral students' need for knowledge about and training in communication.

Today, a thought-through framework for communication training is lacking from third cycle higher education. This is why the Swedish Research Council and Örebro University asked a number of researchers and communicators who are themselves experienced in successfully communicating science to produce this report. The starting points for discussions in the expert team have been questions such as: What type of communicative competence do future researchers need? What are the challenges of implementing courses in communication? What could the course elements include?

The result was the proposed framework for courses in *science communication* that is presented here.

Opportunities for all to partake, in an understandable way, of independent and science-based knowledge is a fundamental part of a democratic and free society. Researchers play a very important role as communicators of knowledge.

We hope that this initiative will inspire national coordination, and give rise to more exhaustive handbooks for and research reviews of science communication in the future. In this way, junior researchers can have the opportunity to develop their communicative skills.

Finally, we would like to say a big thank you to the participants in the expert team, who with great enthusiasm, engagement and joint efforts – which, in themselves, are a good example of what science communication is all about – have put together this report. Thank you also to all who have shared their knowledge and experiences at dialogue meetings and via other channels.

Stockholm and Örebro June 1, 2022

Sven Stafström
Director General
Swedish Research Council

Johan Schnürer
Vice-Chancellor
Örebro University

Summary

The demand for science-based knowledge has steadily grown, in line with societal challenges both rising in numbers, and also increasing in complexity. In order to share and co-create knowledge so that it benefits society, researchers need training in how to communicate, but also in how to reflect on communication. Communication and dialogue about research need to become a natural, systematically implemented part of all third cycle higher education.

This report has been produced on the initiative of the Swedish Research Council and Örebro University. The aim is to inspire higher education institutions, faculties and individuals to further develop and collaborate on science communication and communication training for doctoral students.

The report indicates both opportunities and challenges in relation to communicating research within academia and in the outside world. The framework for science communication courses is based on discussions within a group of researchers and communications experts. The framework consists of three parts, where each part includes both theory and practice. The idea is to use experience-based knowledge exchange and collaboration between different competences, and to vary teaching methods with practical exercises.

Communicating research is a demanding task. To succeed with knowledge transfer, you need to know the groups the knowledge is to be shared with, and to reflect on the context and the own role. You also need practical skills in formulating and structuring the content, as well as knowledge about rhetoric, writing and presentation techniques. Furthermore, you need knowledge about suitable channels and arenas, about the various logics that direct communication in different societal spheres, and about the help that can be found in literature, handbooks and from the organisation the researcher is working in. Knowledge about methods for involving other actors is also needed, both to enable sharing of knowledge in some cases, and for listening to the expertise that exists outside academia.

The three parts of the framework allow room for dealing with reflection, knowledge and skills in a well thought-through way throughout third cycle higher education.

The framework described in the report is the result of the work and the discussion in the group. The report also describes the background to why the Swedish Research Council and Örebro University started the work. Other related initiatives are also mentioned. The appendices present the pilot course carried out by Örebro University to test the framework in practice, the dialogue meeting held in spring 2021, and the members of the expert group. There are also ideas for further reading and notes to the text.



In order to compete for the public's attention in the fight for knowledge, the view on science communication needs to be broadened.

*Anna Jonsson, Docent/Associate Professor business administration,
Lund University/Score*

About the initiative and the report

The aim is to inspire

This report is aimed at all persons throughout Sweden who make decisions on courses at third cycle higher education level, who plan, implement or are about to choose such courses. That means, anyone from a vice chancellor, dean, research leader or supervisor to a doctoral student.

Many scientists, higher education institutions¹ and other organizations are already engaged in equipping doctoral students with communicative skills. There are niched and locally tailor-made courses for different scientific fields, or in-depth courses in various “techniques”. The idea behind the framework and the recommendations presented here is to inspire further development, and collaboration between higher education institutions, faculties, individual persons or support units for collaboration and communication.² The framework should be regarded as a basis for supplementing or combining the existing range of courses with new elements; locally or in collaboration.

Scientists and communication experts produced the framework

Those who produced the report are themselves successful sharers of knowledge. The group consisted of researchers and communication experts – persons with experience and knowledge of science communication³ within their respective fields. The composition of the group does, to some extent, reflect the largest research subject areas, but the balance was towards humanities and social sciences, since research into science communication is primarily conducted within these areas. The team was set up at the initiative of the Swedish Research Council and Örebro University. The task was to produce a suitable framework for communication training within third cycle higher education, and to test this framework via a pilot course.

¹ Doctoral students are also active in municipalities and industries. For the sake of simplicity, the term “organisation” is used for all these in this report.

² The initiative is in itself an example of a situation where new knowledge is needed in society, and where a team of experts have been brought together to help a public agency to find ways of addressing joint challenges.

³ We use the term “science communication” here as an overall term. Lots of different terms are used to describe sharing knowledge about research, such as “making accessible”, “involving”, “including”, “cooperation”, “co-creating research”, “co-production”, and “citizen science”. The term “science communication” has been used in Swedish public agency texts since 1981. The Swedish Research Council has a Government mandate in this field. See also Vetenskap & Allmänhet, v-a.se; Samsynwiki.su.se

On seven occasions during 2020 and 2021, the team behind this report has discussed their experiences of and views on science communication, not least how a dialogue between different societal actors can provide new angles of approach.

Limitations

This report does not describe a complete course, and does not propose any learning goals. Nor does it include any list of existing courses in communication and science communication at research level. The report does not deal with the legislation and ethical guidelines that regulate the communication field. Nor does the report constitute a handbook or a list of the many different tools and channels available for communicating science.

Here, the focus is on science communication with groups *outside academia*, even if there are of course also points in common with communication within academia. For example, teaching is a form of science communication, and higher education institutions are to differing degrees engaged in promoting scientific writing and 'transferable skills'. For this reason, persons responsible at higher education institutions could discuss whether initiatives to facilitate science communication also outside academia could be said to be part of the higher education pedagogic mandate. The report does not take a position on this issue.



Societal development requires research and scientific knowledge. And for this knowledge to reach out and have an impact also on decision-makers and citizens, we as researchers need to have good skills in adapting our communication to the target groups.

Jonas Stier, Professor social work, Mälardalen University

Doctoral students need knowledge about and training in science communication

The demand for science-based knowledge has steadily grown, in line with societal challenges both rising in number, and also increasing in complexity. So, what is needed for scientists of the future to be equipped to communicate their research in the best possible way? The team of experts behind this report thinks that science communication and dialogue about research needs to become a natural, systematically implemented part of all third cycle higher education. During their education, doctoral students should get the opportunity to reflect on science communication, and to practice different elements in communicating their research. The education has to be flexible and based on the fact that the needs differ within different disciplines.

Courses in science communication should be based on scientifically accepted knowledge, and what applies specifically to communicating science. The team of experts has identified a need to gather together the knowledge that could inspire courses for doctoral students. Several funding bodies and higher education institutions, and also the association VA (Public & Science), have also investigated the preconditions for science communication, which has resulted in insights that have been presented in reports and on websites.⁴

To ensure researchers – particularly junior researchers – can share their knowledge, their third cycle higher education needs to provide them with knowledge about and practice in how to reach out to different actors who may need to become involved in the research, or partake of the research results.

⁴ [Kommuniceraforskning.se](http://kommuniceraforskning.se) is an internet-based toolbox for science communication with ideas for different activities. The examples are taken from events such as European Researchers' Night. [Medborgarforskning.se](http://medborgarforskning.se) is a hub for Swedish citizen science, with features such as a project database and checklist for those who are planning projects. See the fact box on page 44 for more tips.



In today's world, where more and more people live within their information bubbles, science communication becomes ever more important. We must get better at reaching out with facts; the type of facts that only science can contribute.

Christina Dahlgren, Director of Arts and former Head of science communication, Linnaeus University

Three conclusions from the expert team

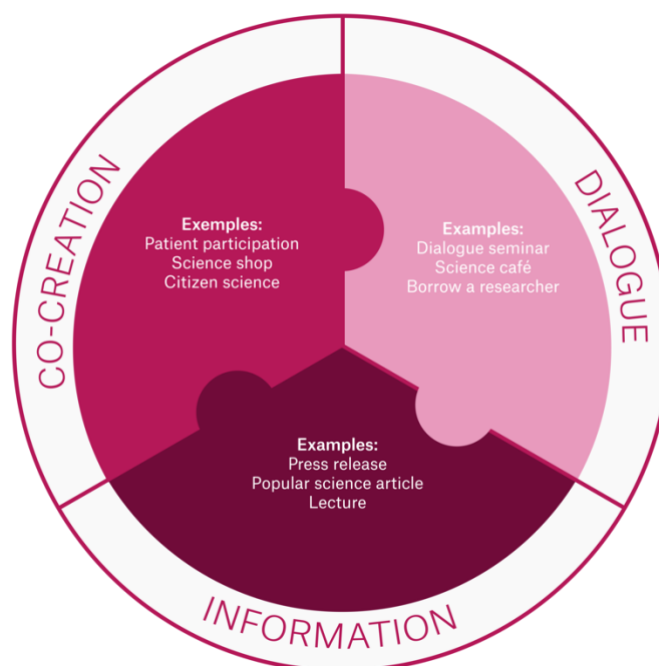
The result of the team discussions can be summarised in three conclusions that influence the proposed framework for training in communication developed by the team:

1. Courses should be based on current research in communication and in science communication. It is important that courses show the breadth of the research fields in question, and deal with different forms of communication, such as information, dialogue, and co-created research.
2. Courses should be based on the scientific tradition of problematising and critical thinking. The range of courses should include both courses that focus on a more overarching understanding of science communication, and courses where the practical competence and the skills the researcher should have are in focus. Theory and practice should be integrated in each part. The theoretical parts should problematise knowledge sharing and the concepts that are used. The practical elements should be based on the doctoral student's own research.
3. Courses should emphasise that communication is part of the research process, and that different actors have separate but complementary competences. Collaboration is often needed between researchers and persons who are professional communicators and collaboration coordinators for example, at the higher education institution. Competences outside the organisation can also be included in the planning and implementation of a communication initiative.

The expert team has used the model below as the starting point for its discussions. The model illustrates a common way of describing communication and science communication in international scientific literature. The team has also gained knowledge from ongoing courses at various higher education institutions that the members had experience of, or that have been mentioned in conjunction with a dialogue meeting. There are many initiatives and good examples of activities and ways of working to continue building on, locally and regionally. It appears common for the courses to cover 3 higher education credits (HEC), and have a practical focus. The group therefore sees a need to also develop sections for problematising and reflection on the importance of science communication.

Figure 1: The three forms of science communication

Information, dialogue, and co-creation are three forms of communication that are often used in parallel. Here are some examples of each form of science communication.



The framework presented in this report is based on the skills researchers need to be able to effectively communicate their research, their results, their roles, and their research methods. The discussions in the team of experts have also concerned how the views of and preconditions for science communication are affected by existing structures and other course activities within the organisations in question, and also by the norms and values that govern the operation. In other words, all needs cannot be satisfied by setting up new courses; some require initiatives at another level and are about the allocation of resources, about cultural change, and about increased collaboration between faculties and higher education institutions, but also with actors outside academia.

A guiding concept for the team's discussions has been flexibility, as there are differences in the needs and focus of higher education institutions, researchers and disciplines. Various complementary initiatives may need to be taken within an organisation. For that reason, no general proposals for learning goals are formulated. Nor does the team have any opinion on whether courses should result in higher education credits or not. The courses need to be developed in collaboration between faculties, departments, researchers and communication departments. The team's discussions show that there are opportunities for collaboration, exchange and reuse, for example of digital course modules.

The discussions have resulted in a framework for courses that was tested in a pilot course at Örebro University during the autumn of 2021. For the initiative to make a difference, more than a framework is required. The team of experts

therefore wishes to share reflections on the strengths and weaknesses of academia, and also on challenges and opportunities in the surrounding society in terms of communicating science. The team's recommendations are based on these reflections.



I do research into local development, politics and planning, and for me it is self-evident that I have to communicate my research results to actors outside academia. It gives me feedback about the plausibility of my analysis, I learn a lot from the conversations that arise, and I get ideas for new research questions. For me, these meetings are something that improve the quality of the research.

Josefina Syssner, Associate Professor cultural geography, Linköping University

Reflections and recommendations

Research and experience bear witness to the fact that there are both obstacles and success factors to take into account in the practical work of communicating science. Some of the preconditions are linked to strengths and weaknesses that can be dealt with within academia. Others are linked to challenges and opportunities in the surrounding society, and are more difficult to influence, but important to take into consideration. (See also page 44 and Appendix 3).

Preconditions within academia

The result of a survey of researchers shows that the largest obstacle to researchers' communication is having too many other tasks with higher priority⁵. The second largest obstacle is lack of resources set aside for communication work. Difficulties finding suitable occasions and/or target groups are mentioned by nearly one third of the respondents. Lack of knowledge and lack of self-confidence are also mentioned as obstacles. Some researchers also mention worry about threats and harassment. Almost one third consider that increased merits for promotion or appointment to positions are incentives that stimulate more communication. One in five see more knowledge of how to communicate effectively as an important incentive.

These obstacles and the lack of incentives can hardly be overcome through just a single course. On the other hand, a well thought-through range of communication courses that run right through the third cycle higher education can be a forum for discussion of what can be done to the obstacles for researchers' communication and contribute to identifying possible routes.

What science communication courses can achieve is to equip researchers with knowledge, tools and methods. Only 27 per cent of research students feel that they are well or fully equipped to communicate their research with the surrounding society, while 58 per cent of professors give the same response in the survey mentioned above. One quarter of the doctoral students feel they are badly equipped, or not at all. Women generally feel worse equipped than men do. Only just under one third of researchers have done a course or have training in communicating their research to the world around them. Less than half have had the opportunity to do such a course. Among those who have done a course, the majority say that they are a bit or much better equipped to communicate their research afterwards.

⁵ *Jag vill men hinner inte! Forskares syn på kommunikation och öppen vetenskap.* Vetenskap & Allmänhet. 2019, pp 63–65 and 75.



Reflecting on how knowledge is shared and put in motion is crucial for building democratic societies.

Jesper Olsson, Professor language and culture specialised in literature and media history, Linköping University

The examination regulations⁶ in Swedish higher education legislation has a requirement for skills and ability in communication. To be awarded a doctoral degree, the doctoral student must:

“show ability in both national and international contexts to present and discuss with authority research and research results orally and in writing in dialogue with the research community and society as a whole”.

Strengths

Science-based knowledge, generated using scientific methods, differs from other knowledge formation, and that is what differentiates academia from other actors with other claims to knowledge. Science communication is prioritised both nationally and internationally and has in recent years been given ever greater importance.⁷ The infrastructure to conduct communication about research and science is good at Swedish higher education institutions, with access to science communicators⁸, collaboration experts and librarians, among others. Many interesting initiatives have also started, for example new formats for dialogue and co-creation are being tested, as are different types of digital aids and artistic expressions.⁹ New methods and tools can improve science communication, new ways of working and new presentation formats for knowledge are linked.¹⁰ The research field of science communication has grown noticeably within the last few decades, in terms of the number of scientific articles.¹¹ Funding bodies have introduced requirements for communication plans in research projects. Several Swedish research funding bodies have also introduced targeted research grants for communication initiatives. Researchers themselves are showing an interest and a willingness to communicate more; half of the researchers in the survey mentioned want to spend more time than they currently do on communicating their research to the world around them.¹² The same survey shows that junior

⁶ Högskoleförordningen (SFS 1993:100), Appendix 2.

⁷ Science communication, public engagement and similar Swedish terms are mentioned in Swedish Government bills on research policy and by research funding bodies abroad, such as the EU’s Horizon Europe, Science Europe and the Global Research Council, and also by the research funding bodies of individual countries.

⁸ In this text, we use the term ‘science communicator’ only for professionally educated and active communicators.

⁹ Since 2013, the annual conference, Forum för forskningskommunikation/Forum for Science Communication has collected and shown good examples. See: Vetenskap & Allmänhet, v-a.se. The website www.forumforforskningkommunikation.se is being constructed.

¹⁰ Examples from digital humanities that point beyond text-based communication in books and articles are, for example, visual representations, digital archives, databases and ‘virtual reality’ environments.

¹¹ Gerber, A. et al. Science communication research: an empirical field analysis. Institute for Science and Innovation Communication (inscico) and com.X Institut für Kommunikations-Analyse und Evaluation. 2020. Page 4.

¹² Jag vill men hinner inte! Forskares syn på kommunikation och öppen vetenskap. Vetenskap & Allmänhet. 2019. Page 75.

researchers have a more positive attitude to the development towards open science than senior researchers do.

Weaknesses

Many courses for doctoral students compete for space in the General Syllabus of third cycle higher education subjects. There is a risk that neither doctoral students nor supervisors' committees prioritise a new course, if the subject matter in it is more or less unknown. Doctoral students may therefore need help to prioritise communication courses. For this, a consensus is needed within the organisation on the importance of science communication. Initiatives that include teachers from different parts of the organisation require established and functioning collaboration formats within the higher education institution, and also good administrative support and a sufficient budget. Working across disciplines is a challenge. But since there are indications that such courses turn out to be more effective if they attract doctoral students from different faculties, it is desirable.¹³

A German review published in 2020 indicates that knowledge about science communication is fragmented.¹⁴ The review shows that publication in the field is spread out across many different area-specific journals, which makes it difficult to identify, assess and continue building on the totality of the scientific knowledge of the subject. The research is solidly anchored in established disciplinary structures and habits, and there is little knowledge transfer between academia and practitioners.

Preconditions outside academia

Opportunities

Outside academia there are operations with their own research centres, and doctoral students are active in areas such as industry, healthcare, municipalities and public agencies. There are also several professional training programmes – such as for military officers, police officers, physicians, teachers, personal care personnel and others – that use educational placements where research is carried out. Research in these environments is based on symmetrical, complementary collaboration and mutual respect, whether the participants contribute with research or their professional experience. There are also many educational actors to collaborate with and employ. VA (Public & Science) is an example of an organisation that works both nationally and internationally to develop the formats for science communication and also its members' competence. Various

¹³ According to the EU project QUEST, “Science communication teaching [..should..] be interdisciplinary, and involve cooperation between diverse researchers, scholars, professional communicators and journalists”. Costa, E; Davies S.R; Franks, S; Jensen, A; Villa R; Wells R; Woods R. 2019. D4.1: *Science Communication Education and Training across Europe* (1.0) | Project Quest. Page 4.

¹⁴ Gerber, A. et al. *Science communication research: an empirical field analysis*. Institute for Science and Innovation Communication (inscico) and com.X Institut für Kommunikations-Analyse und Evaluation. 2020. Pages 6, 43.

groupings, such as patient associations, environmental groups and cultural associations, are engaged and contribute through ‘citizen science’ to collecting or analysing data. Meetings between art and science show that new collaborations and meeting places facilitate communication and create interest in research among new groups¹⁵. Trust in researchers has remained strong among Swedes in recent years¹⁶, probably as a result of reports about the increased imbalance of the Earth’s climate, the emergence of the most recent pandemic and other crises¹⁷.

Challenges

At the same time as trust in researchers has remained high in Sweden except for some isolated years¹⁸, the phenomenon and concept of ‘fact resistance’ has emerged. The background is that various societal phenomena at the end of the 2010s contributed to increased populism and political polarisation in many countries¹⁹. The concept is confusing, as it gives the impression of an almost medical condition, that of being “resistant” to knowledge. A better expression is “knowledge opposition”, an unwillingness or inability to accept scientifically established knowledge²⁰.

Much has been written about this development²¹, and different approaches have emerged among those who wish to supply science-based knowledge, or contribute to increased ability to be critical of sources²². For researchers, just as for other people, it is a challenge to cope with the information super-abundance that surround every person via today’s digital channels. A specific challenge for researchers is to monitor and address alternative sources and stories that exist within the specific area where the researcher is familiar with the knowledge frontier and the challenges that a digital media landscape entail. Researchers also need to relate to the different types of logic that direct how the knowledge is used: media logic, market logic, political logic and communication logic – based on its own logic; the scientific logic²³. One major challenge for researchers is

¹⁵ For instance The Art initiative at the Stockholm School of Economics, Accelerator at Stockholm University and the art and culture initiative at Linnaeus University.

¹⁶ VA (Public & Science) makes an annual survey of the public’s views on science, research and researchers. [The VA Barometer](#) is compiled using around 1 000 telephone interviews with a nationally representative sample of the Swedish public.

¹⁷ See for example SvD (2020) “[Därför är tyckarnas kris goda nyheter](#)” and DN Kultur (2022) “[När krisen kommer står experterna redo](#)”, 2022-04-11.

¹⁸ Nine out of ten Swedes asked have great confidence in researchers, both in the very first [VA Barometer](#) from 2002, and in the latest, which was compiled in 2021/2022.

¹⁹ See for example Wikforss, Å. & Wikforss, M. (2021) [Därför demokrati: om kunskapen och folkstyret](#).

²⁰ See for example Klintman, M. (2019) [Knowledge Resistance: How we avoid insight from others](#) and Wikforss, Å. (2020) [Alternativa fakta: om kunskapen och dess fiender](#).

²¹ See, for example, the European Commission’s research programme “[Enlightenment 2.0](#)”. [Joint-research-centre.ec.europa.eu](#).

²² Examples of initiatives for increased criticism of sources: [Viralgranskaren](#) now [Källkritikbyrå](#); [Faktiskt.se](#); [Nyhetsvärderaren](#); [Hur vet du det](#).

²³ See for instance [DI Debatt](#) (2022) “[Forskare och journalister i otakt – dubbla utmaningar](#)”.

how to explain in simple terms what make scientific methods more reliable than other methods for gaining knowledge. These challenges and societal changes require junior researchers to acquire new skills – such as communicative competence – during their training.

Recommendations

Against the background of the discussions held in the expert team and the challenges, but also opportunities, that academia and society are facing, the team makes the following recommendations for courses in science communication during third cycle higher education:

1. Problematiser the meaning of communicating science and reflect on the goals and consequences of researchers carrying out science communication.
2. Be aware of the breadth of the multidisciplinary research field with its large variation of theories, methods, techniques and publication channels. Pay attention also to the different formats that science communication can use: information, dialogue, and co-creation.
3. Emphasise communication as part of the research process, where researchers and other actors have different, but complementary, competences.
4. Benefit from competences within and outside the organisation to create a broader understanding of how science communication can be done.
5. Gather together knowledge and construct courses in science communication based on current research and professional experience.
6. Sandwich theory and practice with exercises and discussion in each part. Sort the course contents based on a conceptual understanding of research, researchers and science communication, via theory to practical competences and skills that doctoral students need.
7. Prioritise later-year doctoral students who have completed some of their third cycle higher education, as they then have greater opportunities to apply the ideas from the courses in their own work.



Independent research is safeguarded when processes and results are open and transparent. Communicating different parts of the research process and sharing the results increases the opportunities to create new knowledge.

Elisabet Nihlfors, Professor educational sciences focusing on leadership, Uppsala University



Science communication,
in particular forms that entail
dialogue, can make you feel that
your research is important.

Magnus Boström, Vice-Dean and Professor sociology, Örebro University

A framework for courses in science communication

The focus of this report is on doctoral students at Swedish research organisations. Courses in science communication can also be offered to science communicators and collaboration experts, which creates room for exchange of experiences and increased understanding of each other's roles. Students, postdocs and more senior researchers can also benefit from courses in science communication.

Teaching methods

The framework is based on several different teaching methods. These courses should interleave lectures, panel discussions and group discussions with practical exercises. Through discussions, ideas are formed about different reasons for communicating, about norms and values, the role of the scientist, and expectations of the impact and importance of research. Abilities that need practicing are, for example, formulating a communication strategy and writing a press release, where the challenges and opportunities of media logic have to be understood and applied. Practice in oral communication can also be carried out, for example through interviews and dialogues with professionals. Both reflection and training are needed for effective presentation. Together, the methods can create preparedness for interaction and dialogue about research (both under normal circumstances and during crises).

Educational idea

The educational idea behind this framework can be summarised as 'experience-based knowledge exchange'. Researchers can learn from each other. Research project leaders are inspiring examples for junior researchers. The pilot course at Örebro University showed that the decision to include doctoral students from different subject disciplines and scientific fields broadened the perspectives in the discussions, a conclusion that is also confirmed by an EU project and a collaboration course.²⁴

²⁴ The QUEST project, funded by the EU within Horizon 2020, found that high-quality training in science communication has three characteristics: it is practice-based, it equips participants with skills in critical thinking, and it is interdisciplinary and includes collaboration between different researchers, professional communicators and journalists. Costa, E; Davies S.R; Franks, S; Jensen, A; Villa R; Wells R; Woods R. 2019. *D4.1: Science Communication Education and Training across Europe*. 2019. Page 4. This also agrees with a pilot course on collaboration carried out; see Jonsson et al. (2021) *Ökad samverkanskompetens inom universitet och högskolor: Lärdomar från utvecklingen av ett kurskoncept*.

Added value can also arise when other professional groups – which researchers often work with to communicate research – are invited. These can, for example, consist of journalists, curators, producers, creatives, artists, project coordinators, designers or representatives of the groups the research impacts on or can be used by. Dialogue across borders can result in increased understanding of how the research can be enriched through discussion and collaboration²⁵. Courses can be planned in collaboration with communications departments, as in the case with the pilot course at Örebro University. The combined competences of both researchers and research communicators are needed, firstly to enable dealing with disinformation and secondly to pass on knowledge that can be translated into decision-making and practice.

The framework consists of three parts. The advantage of this three-part model is to ensure that necessary preconditions and components underlying effective communication initiatives are not missed, which might be the case if a single course is expected to fulfil all aspects. For this reason, the proposed framework entails a gradual ‘movement in stages’, from an overarching perspective to individualities. This also means that discussion, collaboration and practical exercises are integrated in each part.

One lesson from the pilot at Örebro University is that it is important for doctoral students to become aware of the importance of science communication early on during their programme, but the courses should be fitted in when the doctoral students have their own research to base their work on.

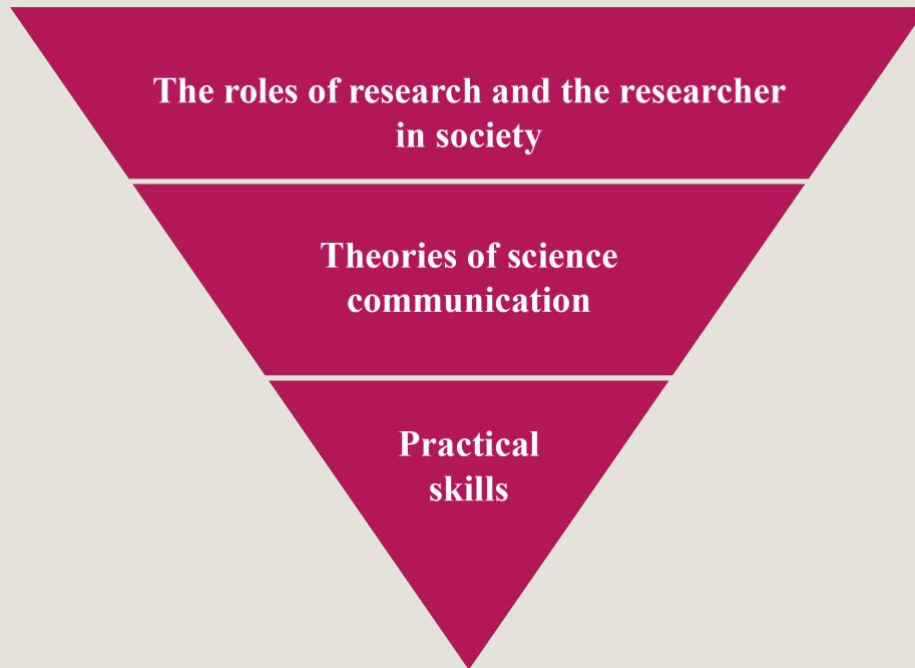
Courses, and information about courses, should be given on equal terms for both Swedish-speaking and English-speaking participants.

²⁵ See for example Jonsson, A. & Grafström, M. (2021) Rethinking science communication: reflections what happens when science meets comic art. *JCOM* 20 (02), Y01.

Framework in three parts

Figure 2: Framework for range of courses in science communication

The framework is based on three levels of courses. The contents of the three parts overlap to a certain extent.





There is important research
that never reaches out. All
researchers should be trained
to communicate, to enable them
to influence societal debate!

Sara Arvidson, Head of Communications, Örebro University

Part 1: The roles of research and the researcher in society

This part can advantageously deal with:

- knowledge theory reflection, discussion of the knowledge policy context, resistance to knowledge, and the role of academia in society,
- open science and communication as processes and tools,
- the role of the researcher, integrity and expectations on the importance of research,
- communication ethics,
- personal communication strategy.

Knowledge is a process, and a constant negotiation

A fundamental feature of the first part is about theoretical and political conditions for how knowledge is communicated and set in motion in society. Society and the public sphere have changed radically during the last few decades – not least the conditions for communication. Doctoral students should know something of how today's public sphere has emerged from the platforms radio, newspapers and books, to today's media landscape with digital networks, databases and social media.

Doctoral students should also have the opportunity to reflect on how these technical transformations have brought with them cultural, economic, political and social changes that impact on the view of knowledge. Today, there is whole range of market actors – from Google to Academia – that tend to reduce knowledge to a product, which affects the work in academia. In parallel, both the concept of knowledge and research itself are being undermined by the information super-abundance, and by political gestures in the form of campaigns based on obvious errors that are launched as facts, or by authoritarian-influenced interventions, where universities are forced to move their operations from one country to another, and where the democratic idea of educational and cultural institutions is hollowed out.

Knowledge is not information or data, but something that emerges through work to create meaning and scrutinising, testing processes. Educational institutions and society are not isolated from each other, but involved in constant negotiation. In order to navigate through this situation and defend the autonomy of knowledge work and the universities, doctoral students need to discuss both the challenges that researchers face, and also the norms and values that surround their professional roles.

Open science and communication belong together

Openness in research²⁶ is not as simple as it may seem. As data and knowledge are not the same thing, the transition from one to the other becomes a process of both scientific and political character. A theme that fits well into the first part of the framework relates to the transparency surrounding the scientific way of working that is required to enable knowledge to be shared, not just by academia, the business sector and the public sector, but also by citizens themselves. The structural conditions for this openness and accessibility need to be discussed: the conditions for knowledge sharing are not the same and self-evident everywhere, but are affected by complex connections between factors such as socio-economic and cultural preconditions.²⁷

Dialogue, co-creation and collaboration require integrity. Requests are sometimes received from the business sector and public agencies that do not harmonise with the critical questioning approach of the role of the researcher. Within the Young Academy of Sweden, the concept of ‘motverkan’ (“unfluence”) has been discussed as a necessary parallel to ‘påverkan’ (“influence”).²⁸ This is about reserving the right to be quiet, thoughtful and critical of society, to value one’s integrity in situations with conflicting goals. Resistance is also brought up in an essay in the anthology *Kampen om kunskap – akademi och praktik*.²⁹

Equally important is that individual doctoral students reflect on science communication as an integral part of knowledge formation. This gives rise to a number of questions about the formats for sharing: What medium is best suited? What psychological factors do I need to consider when I meet my audience? What aesthetic expression is the most suitable and inclusive? The fact that knowledge formation is an activity where many can participate has become clear in recent years, as phenomena such as ‘citizen science’ have emerged. New publication formats have been created. Higher education institutions are collaborating with museums and schools. The broadening of the formats for

²⁶ The concept of ‘open science’ was launched at EU level in 2016, and aims to make science more open and inclusive. The transition shall be implemented by 2026, and is in Sweden driven forward by the [Swedish Research Council, vr.se](http://www.vr.se), and the [National Library of Sweden, kb.se](http://www.kb.se), under a Government mandate. With open access to scientific information, the results of research can be used by others – both within and outside the research community. The concept is also used for the processes and strategies used to achieve this goal, and this includes science communication. See also: [Vetenskap & Allmänhet, v-a.se](http://www.vetenskapochallmanhet.se).

²⁷ One example of the complex connections of the structural conditions is the difficulties experienced by the Swedish Public Health Authority in reaching out with information about vaccines and vaccination to certain groups during the COVID-19 pandemic in 2019–2022.

²⁸ [Samverkan, påverkan, motverkan](#) – panel talk in Almedalen with researchers and musicians. The Young Academy of Sweden, 2019.

²⁹ “Motverka!” Svensson, P., 2019 in *Kampen om kunskap: Akademi och praktik*. (eds) Johnsson, A., Brechensbauer, A., Grafström, M. & Klintman, M. Santérus publishing house.

knowledge formation should also be brought up in the first part of a communication course for doctoral students.³⁰

The researcher's roles in society

Every doctoral student needs to ask themselves at an early stage the question: Why do I want to become a researcher and what do I want to contribute? When doctoral students have the opportunity to reflect on their motivation, thoughts are awakened about the purpose of research, and the importance it might have – what is often known as ‘impact’³¹.

Worry about simplification is something that many researchers and doctoral students experience when it is time to communicate their results externally. This worry is not unjustified. But the insight that knowledge always needs to be shared in order to be of use to society often makes it easier to make the effort to be understood. In order to enable more people outside the researcher's own circle to use research results, a form of ‘translation’ is always necessary. Researchers also have a duty to share any results of immediate societal relevance.

Another challenge arises when researchers leave their laboratories or archives to answer questions on the radio or television. They might suddenly be faced with questions and claims that cannot be answered with knowledge from their own fields, which creates a risk of ‘borrowed’ or false authority. Such situations require integrity. Doctoral students need to discuss where to set limits, and the different roles that may be available for researchers – as intellectuals, critics, and activists.

Communication has ethical aspects

When researchers communicate, they must take into account ethical aspects. For example, researchers need to consider both individuals and groups when data and material from informants and sources are handled and described. Researchers also need to ask themselves in what contexts it is suitable to share preliminary research results. Other ethical aspects that should be discussed in Part 1 include weighing up interests and finding a reasonable balance between different legitimate interests. How should researchers take into account that knowledge sharing is always conditional, and that some groups have greater resources and better preconditions for partaking of and using knowledge? How should researchers relate to knowledge that has been produced in other research

³⁰ At [COMPASS, Linköping University](#), researchers study the medial and aesthetic forms that enable the creation and circulation of knowledge, as well as the norms that regulate and limit it. There is a course on “Kunskapens rörelser: mellan form och norm”.

³¹ Impact is a concept that should be treated with care and nuance, considering the differences between disciplines and scientific fields, but also because of the real difficulty of measuring the societal importance of a certain piece of knowledge. In the United Kingdom, the Research Excellence Framework was [UKRI's, ukri.org](#), first exercise to assess the impact of research outside of academia. See also for example Mats Benner's and Sven Widmalm's essays in above mentioned collection of essays by Brechensbauer et al. (2019).

fields, and within other professions? How should researchers relate to funding sources that have a financial interest in the research result? The link between communication and ethics is shown in examples worth considering in the report *Good Research Practice*.³²

Every researcher benefits from having a personal strategy for communication

Doctoral students need tools to enable them to create their own position and strategy in relation to communicating research. Before choosing an arena, a medium and a platform, every researcher needs to ask themselves: What should I share, and for what purpose? In what format is this best done? Who shall I share the knowledge with (companies, public agencies, civil society), and who does not have a voice (social group, sex/gender identity, ethnic background, religion/faith, functional disability, sexual orientation, age)? Who do I represent?

³² *God Forskningssted / Good Research Practice* (VR1708) discusses various research dilemmas. The publication is currently being revised and updated.



For my part, I see science communication – reaching out with knowledge – as an integral part of my task as a researcher. It is both a privilege and an obligation.

Armita Golkar, Docent/Associate Professor, Department of psychology, Stockholm University



Communication is important for ensuring results are utilised by organisations, inspire young people, and influence decision-makers.

Robert Lagerström, Docent/Associate Professor IT security, KTH Royal Institute of Technology and member of Young Academy of Sweden

Part 2: Theories of communication and science communication

This part can advantageously deal with:

- starting points and goals for science communication,
- media logic, market logic, political logic and communication logic,
- orientation in the group(s) the communication relates to,
- rhetoric,
- personal communication plan.

Being aware of drivers and different forms of communication

Communication is a description of the process whereby humans jointly interpret and create meaning from information.³³ The concept of communication originates in the Latin *communicare*, which can be translated as ‘doing jointly’. Just like in the first part of the framework, doctoral students need to discuss the context and drivers behind communication in Part 2. The discussion should bring up differences between organisations, research teams and individual researchers.

The concept of science communication has been defined as “(...) the public communication of and about science, its findings, methods and processes”³⁴. It is a multidisciplinary research subject, which has different backgrounds and focuses in different countries. The core of the subject has the same pair of opposites as other communication science fields – transfer of information versus creating meaning through dialogue. Contrary to what is described as ‘strategic communication’, which within the framework of academia may concern things such as the organisation’s legitimacy or brand, or attracting students to the university, ‘science communication’ is primarily about communicating research.

Learning about different logics

A central factor for those who want to succeed in communicating is understanding how different logics govern communication in the public sphere. This includes knowledge about how documentation for political decision-making is compiled, what mass media prioritise, how the market logic has an impact and how people absorb new information and knowledge.

³³ Falkheimer, J. & Heide, M. (2022). *Strategic Communication: An Introduction to Theory and Global Practice*. NY: Routledge.

³⁴ Schäfer, M.; Fähnrich, B. (2020). Communicating science in organizational contexts: toward an “organizational turn” in science communication research. *Journal of Communication Management*, 24(3):137–154.

Four logics govern communication in the public sphere

In simplified terms, there are four logics that influence the work with science communication, using different means and with different goals:

- the news messages of media logic
- the brand messages of market logic
- the opinion-forming of political logic
- the joint creation of meaning of communication logic.

The different logics impact on the preconditions for how research can be communicated. In Part 2, doctoral students should therefore familiarise themselves with rhetoric, opinion-forming, influencing, and theories relating to engagement, participation and dialogue.

Choosing methods

Communication about research can have different starting points:

1. one-way information about new knowledge for the purpose of educating,
2. dialogue to interpret and create meaning together,
3. co-creation before, during and/or after a research project for the purpose of creating engagement.

Different communication methods have different advantages, and are often used in parallel to reinforce each other. Sometimes information on the internet or in other media is the starting point for dialogue, sometimes co-creation is the first step and information the result that then – firmly established and processed – is communicated further in a larger context. The value of the communication for those involved is greater the more actively they are participating. Methods and formats can vary a lot, depending on the subject discipline and scientific discipline.³⁵

The panel composed of international experts that carried out a thematic subject evaluation of political sciences on behalf of the Swedish Research Council in 2021 encouraged the departments to support their personnel in their efforts to generate “societal impact”, and recommended researchers in this field to consider explicitly the form of dissemination that is appropriate. The panel considered that in many circumstances traditional methods (meetings,

³⁵ The formats of co-creation are adapted to the research field, project and target group. Compare the different preconditions that follow from working with groups such as: patient associations, environmental associations or tenant-owner associations; healthcare personnel, teachers or other professions; children and young people; or decision-makers at local, regional or national level.

participation in committees and so on) are appropriate, but there is merit in thinking of innovative ways that may reach different audiences.³⁶

Goals for communicating research are sometimes conflicting

There can be several possible goals for communicating research. Doctoral students need to be aware that some goals can be in direct conflict with each other and be prepared to manage such goal conflicts in their work.

Examples of different goals for communications can be to:

- inform
- engage
- counteract
- market
- educate
- listen
- influence
- legitimise.

How do others see research?

Using the discussion about different logics, starting points and goals that are behind initiatives in communication as the starting point, courses in Part 2 can focus on what research means for the group or groups that the doctoral students themselves want to target, or who are affected by the research. Those who wish to influence or collaborate with others must try to understand how they think. This part can benefit from including a discussion of how the benefit of research can be expressed³⁷, and how opportunities for communication are planned in throughout the research process. Questions that can be discussed are, for example: What characterises the group in question? Where do they get their information on the subject from? How heterogeneous is it? How does the group move in the digital public sphere? When and how would it be suitable to initiate personal contacts with groups such as decision-makers in parliament, county councils or municipalities, or with groups active in business, industry or public agencies – or with school pupils?

A personal plan makes things easier

Part 2 should end with ideas for a personal communication plan. Individual researchers have the best knowledge of their individual projects, and therefore the main responsibility for making communication initiatives. The organisation's communications department also has a responsibility in terms of supporting researchers. Both target group orientation and communication plans are things

³⁶ *Quality and impact of research in political science in Sweden – A pilot evaluation*. VR2108. Page 67. The evaluation was the first one carried out by the Swedish Research Council according to a new model aimed at capturing scientific quality. The report includes case studies that describe communication initiatives and their importance, primarily for decision-makers, organisations and associations.

³⁷ Research can create an impact on several levels: social, professional, scientific and personal.

that trained communicators can help with. Such documents are good to have when, in Part 3, doctoral students are working with concrete texts and presentations, as these impact on factors such as what form and what use of language is the most effective in terms of making themselves understood by the group.



Knowledge is of no benefit
in a desk drawer.

*Anna Maria Fleetwood, Senior Adviser External Relations,
Swedish Research Council*



Good dialogue about new knowledge does not just influence society and people's living conditions, but also researchers and research.

Caroline Runéus, Director of Communications, Lund University

Part 3: Skills for communicating research

This part can advantageously deal with:

- genres and language: composition, rhetoric, plain language, accessibility,
- collaboration with communicators, other competences,
- communication channels and platforms,
- collaboration with different actors,
- practical preparedness for handling setbacks.

Explaining in simple terms is difficult

New knowledge is needed in conjunction with crises of different kinds.

Knowledge is also needed when public agencies, civil society, companies or citizens are facing new challenges. The political processes require access to expert knowledge at different levels – national, regional and local. This knowledge transfer and the tools needed in such situations need to be discussed in courses included in Part 3 of the framework.

In Part 3, doctoral students should learn different ways of making a message clearer and easier to understand, irrespective of whether it is a written text or an oral presentation. These concern factors such as laying out the content clearly, tone of language, choice of rhetorical figures, adaptation to genre and requirements for plain language and accessibility. For these tips to be remembered, the knowledge also needs to be practiced in concrete exercises. Doctoral students can, for example, practice writing about their research using different text genres: application, press release, debate article, policy brief, etcetera. Exercises for oral presentations can be adapted, depending on who the proposed audience consists of: politicians, healthcare assistants, school pupils or journalists for instance. The ability to use plain language to describe the process and method, as well as opportunities, risks and limits of the research results also contributes to greater assurance and self-esteem when doctoral students talk about their work during spontaneous meetings with neighbours and friends.

Courses can bridge gaps between researchers and support functions

Doctoral students also need to know how the collaboration with the organisation's communications department and communicators usually works. The 2019 survey by Science & Public shows that approximately half of all the researchers have poor knowledge about the types of support they can receive from communicators at their higher education institutions.³⁸ The researchers in the study call for greater resources for communicating, and more invitations to take part in communication activities. A course where doctoral students and communicators meet is one way of bridging this gap.

Communications departments have both practical experience of and competence in science communication. Communicators emerged as a group of professionals

³⁸ *Jag vill men hinner inte! Forskares syn på kommunikation och öppen vetenskap.* Vetenskap & Allmänhet. 2019, page 71.

as a result of digitisation and technology development. In a world where many feel that they are drowning in information, communicators can contribute to finding slants and approaches of public interest also for subjects that are not easy to communicate. They can help make a message cut through the noise, and also show how you can monitor the current environment, sift and evaluate your own communication initiatives. In this way, researchers can get help to invest their time in the right things. Fundamental for good collaboration is understanding of each other's roles and competences.

At its best, science communication is a collaboration between researchers and other experts within the organisation. Here, meetings within the framework of a course can contribute to new contacts, and perhaps new ways of collaborating. Such a course can, of course, also include meetings with persons with other complementary competences, within or outside the organisation, such as linguists, rhetoricians and journalists, and the pilot course at Örebro University was a good example of this.

Opportunities to test different formats

Doctoral students can also learn about and have opportunities to test different channels. This could involve making a film or a podcast, creating accounts and interacting on social media platforms, training in making extremely short presentations ('elevator pitches'), and updating Wikipedia within their field. One course during Part 3 could deal with how research results and communication about a project can be packaged in the researcher's own channels and in joint channels for the university or faculty.

Collaboration requires preparation

A lot of research and new knowledge impacts on or can be used by different actors. In some situations, it can often be both useful and wise to listen to, co-create with or collaborate with others. According to Swedish legislation, Swedish higher education institutions are mandated to collaborate with the society around them for mutual exchange, and to work towards the knowledge and the competence that exists at the higher education institutions benefitting society.³⁹ The challenge is to find suitable formats for this collaboration. What actors and groups this relates to depends on the research field, the project, and the situation. For example, it might be about collecting data for a pilot study, or sharing knowledge about a completed project. It can also be about finding new ways of communicating while a research project is in progress, and together translate and create understanding of the actual knowledge creation⁴⁰. Here, there might be experts in the form of collaboration coordinators or collaboration lecturers that can be contacted within or outside the organisation.

³⁹ See Chapter 1, Section 2 of *Högskolelagen* (Swedish higher education act as amended to SFS 2021:1282). For a discussion about how the mandate can be interpreted, see for example the website [Humsamverkan.se](https://www.humsamverkan.se): Vad menas med "samverkan"?

⁴⁰ See for example Jonsson, A. (2020) Samverkan: Om konsten att veta och skapa tillsammans. In Rahm, H., Dunér, D., Hidal, S. & Jonsson, B. (eds) *I Pallas Athenas huvud. Hundra år av humaniora*.

Outside academia, people have differing levels of prior knowledge (and preconceptions) about researchers, research processes and research results. Reaching out requires the ability to understand other perspectives, or a sort of ‘discursive competence’. Those who want others to listen cannot just trust in their own expertise, but must be honest about their starting points and clear in their messages.

The format and language use must be adapted to the target group for knowledge sharing to take place and make a lasting impression. The participants should preferably understand how the knowledge has been obtained, what makes it different from other knowledge claims, and also how it can be used. In many cases, experienced researchers bear witness that such knowledge sharing also gives something back in return, and enriches their further research.

A polarised debate climate requires preparedness

Researchers that communicate, become more visible, and can then also encounter resistance in the form of ignorance, freezing-out, threats and conflicts. Preparedness to handle all types of dilemmas in the public debate – resistance to knowledge, “alternative facts”, disinformation and witch-hunts in social media – is therefore important. It is about understanding the media logic, and at the same time protecting the unique features of academia.

In a polarised debate climate, it is not just researchers within disputed and polarising research fields who meet resistance. For this reason, doctoral students need to be able to defend, not just their results and methods, but perhaps also their choices of research subject and their professional roles. Researchers who participate in the debate can contribute to a more nuanced debate.⁴¹ Researchers’ dialogue with the society around them is extra important in an open society. By contributing to making new knowledge more accessible, research constitutes a form of protection for democracy. In this way, research creates the preconditions that enable fellow humans to make informed choices, and enables scientifically-based knowledge to be used as the basis for decision-making. Openly accessible research counteracts populist influences and resistance to knowledge.

In Part 3, the discussion may focus on support from employers, what the organisation’s security department and communications department can help with, when and how more-or-less personal attacks should be addressed or not, what constitutes the grounds for reporting incidents, and what material is available for those who want to prepare themselves.

⁴¹ See for example the article “[Risk för ökad misstro när forskare tvingas förenkla](#)”, *DN Debatt* 2019.



Research can change the world.
But not without communication.

Jesper Falkheimer, Professor strategic communication, Lund University

A complex society places demands on both research and communication

Throughout history, scientific knowledge has contributed to innovations, development and societal change. Today, many phenomena are complex, and therefore also complicated to investigate. Globalisation, urbanisation and digitisation, and also environmental problems relating to climate change and biological diversity are examples of challenges that are placing new and ever-increasing demands on the scientific community. Research also needs to reach out into society faster and better than before.

This, in turn, places new demands not just on how research is organised, but also how it is communicated.⁴² Sometimes, new formats for research design are needed. Both the research process and its results need to engage more people outside academia, to broaden the understanding of the complexity of the societal challenges and finding new ways of solving the challenges.

The initiators and the expert team consider that communication about research should not be a little side-line or something that researchers do with their left hand when they have some time to spare. Instead, communication should run in parallel with the research, and be planned and integrated into the research work.

“The importance of science communication [...] stems from (implicit) beliefs about science’s value to modern societies, about the nature of contemporary democracy, and about justice and fair distribution of public goods [...] we are never “just” doing science communication, but always also contributing to the development of particular kinds of societies.”⁴³

The ambition should be to place the practical skills into a larger context. The teaching should be guided by the theories and knowledge that exist within the fields of science communication and communication.

⁴² See for example Brossard, D. & Scheufele, D.A. The chronic growing pains of communicating science online. *Science*. 10 February 2022, pp. 613–614.

⁴³ Davies, S. R. An Empirical and Conceptual Note on Science Communication’s Role in Society. *Science Communication*. 2021, p. 128.

Tips for inspiration

In addition to the Swedish channels and meeting places that are listed on the Swedish Research Council's website vr.se, there are a number of networks and platforms that give tips and advice to those who communicate research.

EUSEA, the European Science Engagement Association, has created a portal with links to digital toolboxes for those who are planning courses in communicating research. For example, it shows the outcomes of various EU projects, and links to other organisations, such as: Wissenschaft im Dialog, a German portal for science communication with practical tips; NCCPE, a British coordinating organisation that encourages public engagement.

See: eusea.info/platform/toolkits

Other actors lay claim to knowledge

At the same time as the need for research is increasing, the research community is facing a number of challenges in how research is communicated. With an emerging digital media landscape, where other actors – with other claims to knowledge – can pass on knowledge faster and easier than before, and spread both information and disinformation, the role of the researcher in society and the opportunities to reach out and gain attention are being challenged.

Science communication therefore plays an ever more important role for safeguarding the uniqueness and relevance of research. But the meaning of the concept needs to be discussed, broadened and become more nuanced. A better general level of understanding is needed of how research is set in motion, by whom, and for whom – and what the consequences of this are for the views on science.

Those doctoral students who then leave their research careers also benefit from courses in communication when they create understanding for research in wider circles. Swedish society has everything to gain from having more doctoral students who are well-equipped communicators – both to share new knowledge, and to contribute with educated reflections in the societal debate.

Open science is part of academia's mandate

In recent years, several initiatives have emerged that discuss how research and science can be communicated and become an important matter for more people in society. At the end of 2021, the 193 member states of UNESCO signed a

recommendation on open science⁴⁴, which has legal weight and entails undertakings from the member states. ‘Open science’ is used as an umbrella term for a number of principles, including ‘open access’, ‘open data’ and ‘science communication’. In Sweden, the striving towards an open science society is noticeable in the Government’s most recent research bills (2016 and 2020)⁴⁵, after the EU states’ governments decided in May 2016 that the EU should transition to a system for open science.⁴⁶

When the concept was launched, it entailed the beginning of a culture shift. The purpose of open science is to make the entire research process more accessible, inclusive and transparent. When research results become more accessible, they promote mutual knowledge transfer between actors, knowledge-based decision-making and the participation of citizens.

The EU’s purpose was that the cultural shift would contribute to the EU’s overarching goals, where high-quality research is expected to strengthen both business and society, and in the longer term also promote democracy. Both the EU’s and UNESCO’s descriptions of open science include the ambition that more and different actors should become engaged in the research process. This expectation places new demands on how research is organised and rewarded.

The Swedish Research Council has national responsibility for informing about open science and for coordinating communication about research and research results. It works with a long-term approach to ensure the research benefits society. Together with higher education institutions and other research funding bodies, it stimulates dialogue between researchers, and between researchers and the wider society, via networks and meeting places.⁴⁷ This is the reason why the Swedish Research Council, together with Örebro University, took the initiative to set up an expert team to work out a framework for communications training within Swedish third cycle higher education.

⁴⁴ [UNESCO Recommendation on Open Science](#). UNESCO. SC-PCB-SPP/2021/OS/UROS.

⁴⁵ [The Government’s Research Bill 2020/21:60](#) establishes that both higher education institutions and research funding bodies have a responsibility to design incentives that promote open science for the purpose of making both the research process and research results accessible for the general public. The Government’s aim is that all publicly funded research shall be immediately openly accessible no later than 2026.

⁴⁶ The Swedish decision can be found in the council conclusions 9526/16 of the Economic Advisory Group on Competition Policy (EAGCP).

⁴⁷ The mandate in this area is described on the [Swedish Research Council's web, vr.se](#).



With science communication,
I want to contribute to a more
nuanced societal discourse and
counteract loose assumptions
and misunderstandings about
issues relating to migration
and integration.

*Andrea Spehar, Docent/Associate Professor political science,
University of Gothenburg*

Communicative competence is requested by junior researchers

Education in communication is being requested. In a guide to the quality of third cycle higher education, the Doctoral Committee within the Swedish National Union of Students (SFS) opines that:

“A world-class doctoral education should ensure that doctoral students develop outreach skills early on, targeting both an academic as well as a non-academic audience. It should furthermore ensure that all doctoral students have the option to take courses in outreach if they wish to.”⁴⁸

Internationally too, junior researchers are seeing a need to broaden their education. The European Council of Doctoral Candidates and Junior Researchers (EURODOC) has inventoried transferable skills for early career researchers that are considered to be needing in the future, in addition to purely scientific skills. This includes the following desired competences within the field of communications: oral presentation, science for non-technical audiences, science for policy-making, social media and webinar usage.⁴⁹

In a review by the Swedish Research Council, third cycle higher education has been described as a research field that is important and under-researched, that is formed at the intersection between the universities’ three mandates – research, education and collaboration: “Studies are needed of third cycle higher education as education and research, its various designs and consequences, as well as the governance and leadership of third cycle higher education.”⁵⁰

The development is global

In recent years, several initiatives that raise science communication to policy level have been made internationally, together with issues such as acquiring and evaluating merit. Umbrella organisations, such as the Global Research Council, Science Europe and ALLEA (European Federation of Academies of Sciences and Humanities) have produced guides with guidelines for communication and interaction between academia and the surrounding society. Science communication is highlighted as an urgent and relevant part of science. Several countries are working with national roadmaps and strategy documents. A recent example is Germany, where the ministry for education and research has

⁴⁸ *A world-class doctoral education*. (PDF) The Doctoral Committee within Swedish National Union of Students, June 2021. Page 29.

⁴⁹ *Identifying Transferable Skills and Competences to Enhance Early-Career Researchers Employability and Competitiveness*. (PDF) Brussels. 2018. European Council of Doctoral Candidates and Junior Researchers (EURODOC).

⁵⁰ Lars Geschwind and Eva Forsberg in a review ordered by the Swedish Research Council’s Committee for Educational Sciences. *Forskning om högre utbildning*. (PDF) Vetenskapsrådet, 2015.

produced the report loosely translated as “*Action Perspectives for Science Communication*”⁵¹.

Many interesting initiatives are in progress in Sweden

Vetenskap & Allmänhet (Public & Science) is in 2022 developing pilot courses in communication for senior researchers. This is done in collaboration with Örebro University and Sveriges Unga Akademi (the Young Academy of Sweden) among others.⁵²

Courses can also be incorporated in a range of courses aimed at supporting research careers, such as “karriärkonceptet” (“the career concept”) in Lund with its overview palette of the support available for science communication. This can also be combined with an existing range of collaboration courses and work with stakeholders. They can be accessible as a digital resource with hands-on advice and recorded interviews, where well-qualified researchers provide tips, as at KTH Royal Institute of Technology. It is also a good idea to do as some higher education institutions do, and start informal networks where those teaching can meet, update and learn from each other, and at the same time get an overview of what courses are available. Many higher education institutions can use existing resources, such as higher education educational centres.

The group believes that facilitating networking between those who provide training in science communication to doctoral students is urgently needed and also to follow up, at a later date, what the outcome of these initiatives has been. How well equipped to communicate will Swedish researchers feel in ten years’ time?

⁵¹ #FactoryWissskomm: *Handlungsperspektiven für die Wissenschaftskommunikation*. (PDF) Deutsches Bundesministerium für Bildung und Forschung. 2021. The report involved more than 150 experts.

⁵² Three pilot courses will be implemented and evaluated during 2022. The project is funded by the publishers Natur & Kultur.

Appendix 1: The expert team behind the framework

The group consists of experts in sharing knowledge within their respective fields, who met during 2020–2021 to develop the framework presented in the report.

Anna Jonsson

Docent/Associate Professor business administration, Lund University/Score

Andrea Spehar

Docent/Associate Professor political science, University of Gothenburg

Armita Golkar

Docent/Associate Professor Department of psychology, Stockholm University

Caroline Runéus

Director of Communications, Lund University

Christina Dahlgren

Director of Arts, former head of science communication, Linnaeus University

Elisabet Nihlfors

Professor educational sciences focusing on leadership, Uppsala University

Jesper Falkheimer

Professor strategic communication, Lund University

Jesper Olsson

Professor language and culture specialised in literature and media history, Linköping University

Jonas Stier

Professor social work, Mälardalen University

Josefina Sysner

Prefect at IKOS, Associate Professor cultural geography, Linköping University

Magnus Boström

Vice-Dean, Professor sociology, Örebro University

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Docent/Associate Professor IT security, KTH Royal Institute of Technology, and member of Young Academy of Sweden

Sara Arvidson

Head of Communications, Örebro University

Anna Maria Fleetwood

Senior Adviser External Relations, Swedish Research Council

Appendix 2: Pilot course in science communication for doctoral students at Örebro University 2021/2022

The expert team's framework was tested in practice at Örebro University during the 2021/2022 academic year, during the period October–January. The course was open for applications from doctoral students in all scientific fields at Örebro University. It covered 7.5 higher education credits (HEC), and the teaching language was English. The course range consisted of three courses covering science communication with theory, planning and practical elements. The doctoral students' work was based on their own research material throughout all courses:

- Role of the researcher in society, 2.5 HEC
- Communication planning, 2.5 HEC
- Practical exercises, 2.5 HEC

The first course covered the roles of research and the researcher in society. The second course covered planning and integration of communication in the research activities. It discussed communication both as information and as co-creation with selected target groups. The third course consisted of a series of practical exercises in oral presentations and in popular science writing (for example writing a debate article, and publishing and editing own research results on Wikipedia).

The recommendation was for doctoral students to complete all three courses, but for the sake of flexibility it was also possible to complete only one or two of them.

Contents and goals of the pilot course

Science communication: Role of the researcher in society

The course covers the role of research and the researcher in society. It discusses what science communication entails, and its importance for both societal debate and research quality. The relationship between the conditions and needs of research and science communication are discussed, and to what extent there are synergies and conflicts between these two practices. Opportunities, challenges and various dilemmas linked to science communication are covered. These relate both to personal issues about being visible in media and societal debate, and issues such as responsibility, security and ethics linked to science communication.

To pass the course, doctoral students shall show:

1. knowledge about the meaning and importance of science communication, both for societal debate and a non-academic audience, and for research quality,
2. knowledge about the various expectations of the role as researcher and the need to reach out to a non-academic public,
3. ability to develop strategies for handling complexity, uncertainty, resistance to knowledge and other dilemmas in science communication, including taking into account issues relating to gender and ethics.

Science communication: Planning

The course covers planning and integration of communication in research activities. It discusses communication both as information and as co-creation with selected target groups. The planning includes elements such as purpose of the communication, work on messages, definition of target groups, relevant channels (media, social media, etcetera.), and tools for communication. Teaching about the various ways in which media function is included in the course.

To pass the course, doctoral students shall show:

1. knowledge about the multitude of focuses and expressions of science communication, including problems and opportunities associated with different methods,
2. ability to plan science communication in a purposeful way, by stating target groups and channels, and showing how science communication can be integrated in the various component parts of research practice,
3. ability to develop strategies for handling complexity, uncertainty, resistance to knowledge and other dilemmas in science communication, including taking into account issues relating to gender and ethics.

Science communication: Practical exercises

The course covers what characterises good science communication, oral and written, and what is important to consider in various types of communication, including use of social media. The course consists of a series of practical exercises in oral presentation and in popular science writing (for example writing a debate article, and publishing and editing own research results on Wikipedia). The component elements also cover strategies in relation to social media. Doctoral students work with their own thesis material.

To pass the course, doctoral students shall show ability to:

1. communicate science concisely and understandably to a broader public, using various oral, written and visual methods,
2. develop strategies for handling complexity, uncertainty, resistance to knowledge and other dilemmas in science communication, including taking into account issues relating to gender and ethics.

Implementation of the pilot course

The lectures were held in English, but the doctoral students were able to work with their own research material and to carry out course tasks in either English or in Swedish. Each course included one test with several subsidiary tasks.

For all three courses, personnel from the communications department collaborated with the other teachers. The teachers doing research work in the fields of sociology, psychology, informatics, rhetoric and medicine. External experts in research into science communication and journalists from the journal *Forskning & Framsteg* and the opinion and editorial sections of the daily newspaper *Dagens Nyheter* were also recruited to the course.

Örebro University made certain local adaptations and introduced some course elements in a different order than that used within the framework in this report.

The initiative to the doctoral student course was taken by Sara Arvidson, Communications Director, in consultation with the Vice Chancellor, Pro-Vice Chancellor and Dean of the Faculty of Humanities and Social Sciences at Örebro University. The course was then put together by a team consisting of the communications department and a number of researchers who had shown greater interest and skills in science communication. Professor Magnus Boström, Vice-Dean for Research and Education at Research Level at the Faculty of Humanities and Social Sciences was responsible for the course. The team members had responsibility for different parts of the teaching of the course, which became part of the doctoral programme at the Faculty of Humanities and Social Sciences.

Internal teachers:

- Magnus Boström, Professor of Sociology
- Sara Arvidson, Head of Communications
- Åke Grönlund, Professor of Informatics
- Linda Harradine, Science Communicator
- Maria Ojala, Associate Professor of Psychology
- Noah Roderick, Senior Lecturer in Rhetoric
- Assimakis Tseronis, Senior Lecturer in Rhetoric
- Andreas Ohlin, Senior Lecturer in Medicine

External teachers:

- Sarah R. Davies, Professor of Technosciences, Materiality and Digital Cultures, University of Vienna
- Lina Wennersten Bergner, Humanities Editor, *Forskning & Framsteg*
- Per Snaprud, Natural Sciences Editor, *Forskning & Framsteg*
- Nils Öhman, Editor, Opinion & Editorial, *Dagens Nyheter*
- Olle Terenius, expert on Wikipedia and Docent/Associate Professor of Biology, Uppsala University

Lessons learnt from the pilot course by the team at Örebro University

It was good to include doctoral students from different subjects and scientific fields, as this brought a wide range of perspectives to the discussions.

It was valuable to do an educational course where the communications department collaborated with researchers from different faculties – and that the teachers were science communicators, lecturers/researchers from academia and guest lecturers from the media and academia. This built bridges and created an invaluable understanding of each other's activities.

Another positive effect was the doctoral students' appreciation when the feedback on the exercises related to more aspects than those that are usually assessed in media training.

However, the design of the course will be considered in the future, in particular Parts 2 and 3. The exercises in writing a communication plan, oral presentation (pitch) and debate article writing need to be preceded by more training in the differences between popular science writing and academic writing. The doctoral students tended to become stuck in the academic way of writing, for example in the problem formulation, and had difficulty highlighting their own research. The programme team behind the pilot course therefore thinks it would be good to fit this course into a late stage of the third cycle, when the doctoral students have concrete research results to base their work on.

The team does not recommend digital teaching or hybrid solutions for the practical third part of the course. A physical meeting is necessary, with discussion of concrete examples ahead of the practical exercises with communication plans, oral pitches and debate articles.

In the evaluation of the courses in the pilot, the doctoral students were largely satisfied. However, there was some criticism that Part 3 was not sufficiently academic.

Because of the heterogenous teaching team, the course was large and resource-intensive. It is a challenge to organise faculty-wide and university-wide courses, as the existing structure favours 'silo management' practices. For this reason, an established and functioning base organisation is needed, to plan, spread awareness of and implement the teaching. Functioning administrative resources and a substantial budget are also needed to fund the input by the teachers. In brief, this course required greater inputs from the university than most other doctoral student courses.

The Faculty for Humanities and Social Sciences at Örebro University has an ambitious third cycle higher education programme. The communication course will now be part of the development of this programme. The faculty plans to offer a new version of the course in science communication during spring term 2023.⁵³

Two quotes from doctoral students on the pilot course

“As I did the first part of the doctoral student course in science communication at the university last autumn, I thought it might interest you that Svenska Dagbladet has today published an essay I wrote for their Under Strecket/Below the Line section. I had real benefit from what I learnt on the course when writing the text and in my contacts with the editor, so I thought this might be something you wanted to use as a reference if you, at any time, need to argue for the benefit and relevance of the course.”

“Thank you for the course and your comments on my article about soil remediation. I am seriously thinking about sending my debate article to a newspaper. Off course I need to work on it, still, your comments provide a good starting point!”

⁵³ The programme is presented under the Faculty for Humanities and Social Sciences on the [Örebro University website oru.se](http://www.oru.se).

Appendix 3: Dialogue meeting: “Let doctoral students communicate more!”

The initiative behind this report and the proposed framework was presented at a webinar on 29 April 2021. The hope was that the joint initiative by the Swedish Research Council and Örebro University, together with the expert team’s inputs, would gather together interested parties from different higher education institutions and different scientific fields for a wider discussion on how third cycle higher education can be updated. The dialogue meeting gave a hint that many want to discuss how to address the challenges that emerged in the report “Jag vill men hinner inte...”⁵⁴ It reported requests for making the material from different courses in communication accessible, as a shared knowledge library.

Participants from many higher education institutions

Invitations were sent to course directors, researchers in the field of science communication, funding bodies, doctoral students and others who are engaged in the development of third cycle higher education. The webinar attracted 89 participants from different higher education institutions and organisations. The participants were from Uppsala University, KTH Royal Institute of Technology, University of Iceland, Linköping University, Karolinska Institutet, Royal Swedish Academy of Engineering Sciences (IVA), Stockholm University, Linnaeus University, University West, Mid Sweden University, Lund University, Chalmers University of Technology, Örebro University, Jönköping University, Public & Science (VA), Västra Healthcare Region, Young Academy of Sweden, Swedish International Development Cooperation Agency (SIDA), Natur&Kultur, Formas, University of Gothenburg, Halmstad University, University of Skövde, Mälardalen University College, Malmö University, Swedish University of Agricultural Sciences, BI Norwegian Business School, Karlstad University, University of Borås, Region Jönköping, Riksbankens Jubileumsfond, Stockholm School of Economics, Swedish Board of Agriculture, Swedish National Union of Students (SFS), Luleå University of Technology, Swedish Childhood Cancer Fund and the Swedish Research Council.

The majority of the participants seemed to think that it would be a good idea if third cycle higher education had a more uniform design of communicative courses, and that this was done in national collaboration. “Exciting project and exciting presentations”, and “fantastic that this is at last happening” were some of the comments in the chat function during the meeting. There is interest from several quarters to monitor the initiative.

⁵⁴ *Jag vill men hinner inte! Forskares syn på kommunikation och öppen vetenskap.* Vetenskap & Allmänhet. 2019.

Group discussions and feedback

After the presentation, the following questions were discussed in separate groups:

1. What do you think about the things you have heard?
2. How far have different universities come in terms of teaching doctoral students about communication?
3. How can we collaborate and continue networking?
4. Inputs to the arrangers – success factors?

A selection of the views and questions from the meeting

Many of the views at the meeting confirmed the recommendations and the proposed framework. Some views go beyond what is dealt with in this report.

Implementation and organisation of courses

- Researchers in different disciplines have differing preconditions for communication and different needs to communicate.
- The culture of research teams and the attitude towards science communication of supervisors/research leaders is crucial.
- Of crucial importance is also having sufficient support within the organisation.
- There are both advantages and disadvantages of having courses that are mandatory and elective respectively.
- Doctoral students must be told at an early stage that there are courses in communication, and that they are entitled to do them, so that they can plan their time on the programme.
- Create “streaks” of communication training in courses that already exist, a ‘buffet’ of courses to choose from.
- To make a difference, the courses need to be woven in continuously during the programme, with well thought-through educational progression in the design.
- Courses where doctoral students work with their own material must, by necessity, come later, while the role of the research needs to come early.
- Arrange a one-day workshop, as a taster that can attract participants.
- Irrespective of whether the courses are mandatory or voluntary, the participants need to be examined in some way.

Course design

- Use the learning goals for third cycle higher education in the higher education legislation as the starting point.
- Base the courses on research into science communication training.
- Flexibility is needed, including digital sessions and filmed features. This is because all – including those who for example are abroad – must be able to partake of the courses.
- Communication planning needs to be introduced early on in the course, and continue along the way.

- Awareness of the researchers' role in society and that they are expected to communicate must be included early on during third cycle higher education. Working on your own material for communication must, by necessity, come later.
- Communication courses can overlap with courses in innovation and entrepreneurship. A common factor for all of these is that they relate to processes for utilising research, and require understanding, dialogue, models for listening, and feedback.

Course contents

- It would be good if there were material, such as films, that more people can use. Material produced needs to be accessible digitally somewhere.
- A balance is needed between generic knowledge about communication (what works and what does not) and subject-specific knowledge, for example how history or biology are communicated.
- Include language training and linguistics in the course, for example academic writing, applied linguistics, rhetoric and pedagogics.
- Listen to and learn from communicators from other areas.
- Discuss publication strategies!
- Discuss the replication crisis, which is being highlighted as a threat in humanities and social sciences.
- The world's largest encyclopaedia, Wikipedia, can be used for science communication. Teach what researchers need to consider.

Choice of language

- Many doctoral students at Swedish higher education institutions – upwards of half – speak English, and therefore courses should be given in English.
- Different subjects have differing linguistic traditions to consider.
- One task might be to practice writing about your research in both Swedish and your native language. It is not just about reaching out with the research in Sweden.

Evaluation of courses

- How do we know whether the doctoral students who do courses become better at communicating?
- How can the courses be quality-assured over time?
- Can VA (Public & Science) measure how science communication in Sweden is developing in its annual barometer?

How the initiative can gain acceptance

- The university managements are key to ensuring this is prioritised.
- Compare to how courses in higher education teaching have emerged by necessity.
- Supervisors are very important, they can “market”, but are also important models. Doctoral students may need approval from both their supervisor and the department head for their course choices.
- Many other sectors are better at communicating and filling the public space. Courses in communication are one way of changing this situation.

Incentives and merit accumulation

- Communication must become a way of accumulating merit for researchers. Reward good communication work.
- It is a good idea if the Swedish Research Council asks applicants how they plan to communicate with groups outside academia already at the time of application in Prisma.

Appendix 4: What knowledge and training in communication can give a doctoral student

Career development and personal development

- increased chances of being published and cited
- preconditions for writing better research grant applications
- contacts with communication departments and other support functions
- greater self-assurance in the professional role, when meeting media and other actors in society

Well-honed skills

- more communicative tools for presenting research and its results
- training in writing, presentation and debating

Preconditions for larger networks and increased engagement

- new perspectives on how others notice what researchers do
- new knowledge that makes it easier to arrange collaborations outside academia
- increased understanding of the relevance of research
- increased transparency in the work process

Enriched research

- better idea of what problems are important and prominent in society, and new perspectives on how research can relate to these

Preconditions for interdisciplinary collaboration

- ability to discover new contexts – avoid isolation in the work
- better preconditions for inspiring others to further research
- better preconditions for reaching researchers from other fields or disciplines, and for collaborating across subject borders

Appendix 5: Reading tips

This appendix contains advice, tips and inspiration relating to science communication. The list is not an exhaustive list of the relevant literature.

Books and reports

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