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USING SCIENCE FOR/IN DIPLOMACY
FOR ADRESSING GLOBAL CHALLENGES

TEACHING SCIENCE DIPLOMACY

Planning, delivering and evaluating training activities on Science Diplomacy

Proposals for a curriculum and toolkit for trainers

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Introduction

Who is the toolkit for?

This toolkit is written for trainers who intend to set up a training exercise on science diplomacy (SD). It is directed to those already experienced in teaching the topic, as well as to trainers who are organising their first course on SD, and it is intended for a wide range of institutional settings: governments, academia, international organisations, NGOs, etc.

How do you read this toolkit?

The toolkit is divided into five parts.

Part 1: Training Curriculum offers recommendations on the topics (including subtopics, sources and training materials) to be considered for SD training activities.

Part 2: Training Formats provides guidance on how to set concrete learning objectives and how to choose the most suitable format for the training.

Part 3: In-person Training,

Part 4: Online Courses and

Part 5: Online Workshops

are then broken down into the following key sections:

- ✓ **Phase I:** Planning and Organizing contains guidance for trainers including estimated timeframes for each phase.
- ✓ **Phase II:** Design, Development and Delivery lists tips on how to design and how to communicate it. It also refers to tools that strengthen the interaction between the trainees.
- ✓ **Phase III:** outlines methods for organising reviews and gathering feedback to improve future training activities.

What can S4D4C provide you?

The information offered in this toolkit is based mainly on the training experience gained within the research and innovation project "Using Science for/in Diplomacy for Addressing Global Challenges" (S4D4C). This project has been funded by the European Commission (EC) based on the understanding that SD is a major tool to deploy in national, regional or transnational actions for addressing global challenges. In this project, research was carried out to enhance the understanding of the concept, its challenges and opportunities.

The S4D4C project has implemented several training activities:

- ✓ S4D4C Open Doors Programme (December 2018-April 2019) (link),
- ✓ S4D4C in-person training courses in Trieste (October 2019) (link) and Vienna (November 2019) (link),
- ✓ S4D4C European Science Diplomacy Online Course (started in June 2020 and will also be available after the conclusion of the project) (link),
- ✓ S4D4C interactive webinar series (October-December 2020) (link).

This guide is thus based on the experience of the S4D4C project which aims to

- ✓ provide new insights and a better understanding of the contributions of science and science collaborations to foreign policy goals, especially in the context of European models and experiences,
- ✓ facilitate effective and efficient interfaces for European science diplomacy to take better advantage of European science and science cooperation,
- ✓ provide policy guidance on where and how the European Union (EU) and EU Member State (MS) science diplomacy can be active in the future,
- ✓ increase capacities and knowledge resources for EU and MS science diplomacy,
- ✓ expand global reach and visibility for EU science diplomacy.

Part 1: Training Curriculum

What is SD? How has it been developed as a tool? Who are the SD stakeholders? What are the challenges and opportunities that current societies face which can been tackled by SD? These questions are just a few examples of topics that can be covered in an SD training course. In this part of the toolkit we provide a strategic approach on how to structure your training curriculum. The selection of topics presented below is based on our experiences within the S4D4C project. The suggested content has proven to be effective in teaching about SD for global challenges. We are aware that there are other ways to advance the topic depending on the objectives, target group and general setting of activities. So please consider the following as suggestions.

What can you teach about science diplomacy?

We suggest considering four main training blocks that have been shown to be very beneficial when it comes to teaching SD:

1. SD Definitions,
2. SD Stakeholders,
3. SD Approaches,
4. SD Skills/Career Development.

In the following four sections we present you a set with possible subtopics and relevant information sources to each of these blocks.

S4D4C has compiled open access and open source training materials on its website that you can use for your own SD seminar. We refer to the relevant material specific for each in the list below, please feel free to make use of it.

1. Science Diplomacy Definitions

SD is an umbrella term encompassing a range of interactions between science and foreign policy. To date, there is not a single understanding or definition for this concept. Furthermore, SD is not something new, but a new term coined in a specific historical context as part of a strategic foreign policy initiative.[1] Therefore, we suggest offering your trainees different perspectives and interpretations of what SD is. You can offer some historical examples and present how the SD term has evolved in recent years. Providing some recent critical scholarly reflections to the SD discourse might add value to the discussion. In Table 1 we have collected some practical examples that might help to conceptualise your curriculum. Please keep in mind that the alignment with your training depends strongly on the training format you have chosen (see Part 2: Training Formats).

[1] See S4D4C Online Course Module 2 (link) as well as S4D4C's State-of-the-Art Report on Science Diplomacy (link)

Table 1: Science Diplomacy Definitions

Possible subtopic	Source/Training material
SD interpretations	
Conceptualisation of SD: The most prominent SD interpretation, which also emanates from the functional differentiation thinking, is the three-fold typology brought forth by the AAAS and Royal Society's Report: • Science in Diplomacy: informing foreign policy objectives with scientific advice, • Diplomacy for Science: facilitating international science cooperation, • Science for Diplomacy: using science cooperation to improve relations between countries.	**Source**: The Royal Society (2010): New frontiers in science diplomacy. RS Policy document 01/10. January 2010 - RS1619. London: The Royal Society. ISBN: 978-0-85403-811-4 (link) **Training material:** S4D4C Figure "Science Diplomacy: Vision, Instruments And Actors" for explaining three SD dimensions (link)
Strategic Purposes Approach: Depending on the concrete actions that state actors have offered, three strategic purposes to characterise different varieties of policies and strategies can be distinguished: • Access: improvement of national innovation capacity and competitiveness by better benchmarking international research and development trends and policies, • Promotion: diffusing a country's achievements in the research and development landscape, • Influence: addressing the most explicit political and soft power aspect of SD, influencing other countries' public opinion, decision makers and political or economic leaders.	**Source:** Flink, Tim; and Schreiterer, Ulrich (2010): Science diplomacy at the intersection of S&T policies and foreign affairs: toward a typology of national approaches. In: Science and Public Policy, 37(9), November 2010, pages 665–677. DOI: 10.3152/030234210X12778118264530 (link) **Training material:** S4D4C Training material, see some slides of the presentation "Introductory-Presentation" (link)
Pragmatic Approach: A focus on why a country might invest efforts and resources in SD and international science has been the basis for a more utilitarian framing of SD, and one that might better resonate with government agencies: • "Actions designed to directly advance a country's national needs", • "Actions designed to address cross-border interests", • "Actions primarily designed to meet global needs and challenges".	**Source:** Gluckman, P.D.; Turekian, V.; Grimes, R.W.; and Kishi, T. (2017): Science Diplomacy: A Pragmatic Perspective from the Inside. In: Science Diplomacy, Vol. 6, No. 4 (December 2017) (link) **Training material:** S4D4C Training material, see some slides of the presentation "Introductory-Presentation" (link)
SD Development	
SD triangle of society, policy and science: The term SD neither constitutes a ready-made empirical object nor provides a clear-cut definition. Instead, it is the interplay between science and foreign policy and international relations that creates the notion of science diplomacy. Trainees interested in SD (especially beginners) should get a deeper understanding of the origins and gradual emergence of the SD concept in the discourse of academics and practitioners. Therefore, you as a trainer could show a sociohistorical evolution of concepts that expressed and structured leitmotifs in science policy on one hand, and foreign policy on the other hand. In the 1980s and 1990s, science and diplomacy have been defined as two separate spheres. Over the last decades, we came to witness a slow but steady paradigm shift towards what was termed SD.	**Training materials:** We recommend using two figures to explain the content: 1. Figure "Science Diplomacy Triangle Of Society, Policy And Science" (link) 2. Figure "Science Diplomacy At The Intersection Of Science Policy And Foreign Policy Discourses" (link)

Critical Reflections	
SD Romancing: Trainees should be aware of the growing trend of over-stretching the SD concept, and its shortcomings, as some of the current narratives might fail to clearly address what SD is and what it is not. Social aspects like fierce competition, hierarchy, patronage, reputation games, chauvinism and elitism, scientific misconduct etc. should be considered while talking about SD. Furthermore, the concept of SD is often over-idealistic regarding the scientific outcomes and perspectives.	**Sources**: Rungius, Charlotte and Flink, Tim (2020): *Romancing science for global solutions: on narratives and interpretative schemas of science diplomacy*; Humanities and Social Science Communication (link) Flink, Tim (2020): The sensationalist Discourse of Science Diplomacy: A critical reflection; The Hague Journal of Diplomacy (link) Pierre Bruno Ruffini (2020): *Collaboration and Competition: The Twofold Logic of Science Diplomacy*; The Hague Journal of Diplomacy (link)

Source: Authors' compilation/S4D4C

2. Science Diplomacy Stakeholders

Who are the main stakeholders of SD at the local, national, regional and global level? What is the background of their work? How do they interact and create collaboration networks and how could one explain the existence of different types of networks? These are – from our point of view – some of the main questions which your trainees should be able to answer at the end of a training course on SD. This knowledge is important for a better understanding of the complex SD global landscape. Depending on your target group, you might want to differentiate: if you are planning a training course for scientists, it is useful to highlight the role of governmental stakeholders, industry and the private sector in more detail in order to gather a deeper understanding for "the other side".

Generally, we propose distinguishing between two categories:

1. **Types of SD stakeholders**, where stakeholders of different types are named and explained,
1. **Types of SD networks**, where different types of stakeholder groups interact and collaborate creating networks with different purposes.

Table 2: SD Stakeholders and Networks

Possible subtopic	Source/Training material
Taxonomy of SD Stakeholders	
Types: We differentiate between five groups of stakeholders which all play a significant role in implementing SD activities: 1. **Governmental stakeholders**: involving nation states and subnational governments in science diplomacy. 2. **Inter-governmental and supranational stakeholders**: international and multilateral organisations that transcend national boundaries and that are directly engaged in global governance. 3. **Research and academic stakeholders**: research and academic actors with a stake in SD, ranging from research councils to universities, research centres, national academies, learned societies, and individual researchers. 4. **Industry sector stakeholders**: private companies, which can be trans or multi-national companies as well as Small and Medium Enterprises (SMEs) can also be involved in science diplomacy. 5. **Civil society stakeholders**: the role of national and transnational NGOs, civil society organisations, private charities, and even individuals can be noted in SD.	**Source**: S4D4C Online Course – Module 3 (link) **Training materials:** S4D4C Training material, see some slides of the presentation "Introductory-Presentation" (link). Stakeholder Analysis in the Context of SD (link)

Taxonomy of SD Networks	
Types: Different stakeholders collaborate through networks. Depending on the major purpose of that network, we have grouped them into four categories: 1. **Local or subnational networks**: when their focus is on the local level, such as any global city 2. **National networks**: when their focus pursues national interests 3. **Regional networks**: when the array of activities is focused on a specific world region 4. **Global networks**: involving stakeholders from all nationalities and tackling global challenges	**Sources**: S4D4C Online Course – Module 3 (link) Online Knowledge Resources – Database (link)

Source: Authors' compilation/S4D4C

When we talk about SD stakeholders, we differentiate among organisations involved in SD activities (see Table 2) and SD professions. "Science diplomat" does not exist as a profession yet, but many institutionalised or non-institutionalised positions may fit in the category[2]. Out of these, two dedicated professional profiles are worth presenting:

1. **Science attachés** help establish contacts, organise visits, and report on scientific advancement in the host country. They are a contact point and a catalyst for cooperation between countries.[3]
2. **Science advisers to foreign ministries** are not necessarily experts on all scientific matters but are well-connected to the scientific community and know where to find the most appropriate expert on any given topic. They have the skills to explain evidence required for informed decision-making about foreign affairs, serving as evidence brokers in our increasingly trans-boundary world with constantly emerging complexities.[4]

3. Science Diplomacy Approaches

International cooperation as well as SD as a vehicle for interest and expanding influence are the keys to successful SD approaches, which are partly predetermined by the historical circumstances and by political currents in individual countries. In part it is also the regions in which the countries are located which determine the sense and purpose of individual SD measures. We have observed that topics in the field of global challenges are crucial for SD activities. Therefore, the thematic approaches such as global health (like COVID-19) or water diplomacy might be interesting for your trainees. The field provides concrete practical examples of SD in action, which is always helpful when it comes to learning. Our experiences have shown that a compilation of different examples helps to explain the variety of SD approaches – in consideration of the objectives of your training course and the needs of your target group.

Table 3: SD Approaches

Possible subtopic	Source/Training material
National Approaches	
Leading countries in science, technology and innovation were the first to devise national SD approaches. If you decide to present several comparative national approaches, we recommend that you consider different cultural identities, scientific structures and political instruments, e.g.:	**Sources:** S4D4C Online Course – Module 5 (link) AAAS (2005): National Approaches to Science Diplomacy: An Education Resource; Countries: Canada, Japan, New Zealand, South Africa, United States (link)

[2] Sources: S4D4C Online Course- Module 2 (link) and Melchor L, "What Is a Science Diplomat?", The Hague Journal of Diplomacy, 15(3) (link)
[3] Source: S4D4C Online Course – Module 6 (link)
[4] Source: https://www.ingsa.org/divisions/fmstan/

Possible subtopic	Source/Training material
European Countries (some examples) • **Germany**: explicit approach -> Strategy of the Federal Government for the Internationalisation of Education, Science and Research; • **France**: structural approach -> Large-scale research infrastructure; • **Spain**: bottom-up, multi-stakeholder approach -> Spanish science diplomacy networking via dialogue with civil society and researchers' associations. **Non-EU countries** (some examples) • **China**: implicit approach -> "One Belt, One Road" initiative; • **USA**: structural approach -> American Association for the Advancement of Science (AAAS), US Department of State, US Agency for International Development (USAID); • **Japan**: structural approach -> Science adviser to the Minister of Foreign Affairs and SD board.	Langenhove, Luk van (2017): Tools for an EU science diplomacy; Countries: Germany, Spain, France, Switzerland, the UK, the US and Japan (link)
Regional Approaches (some examples)	
One of the best-known international approaches is the Intergovernmental Panel on Climate Change (IPCC) - the United Nations body for assessing the science related to climate change. Focussing on regional approaches, the S4D4C project has analysed mainly EU activities with different countries and regions, e.g.: • Partnership for Research and Innovation in the Mediterranean Area **(PRIMA)**: the most ambitious joint programme in the framework of European-Mediterranean cooperation. • Synchrotron-light for Experimental Science and Applications in the Middle East **(SESAME)**: a "third-generation" synchrotron light source which aims to promote science for peace and international cooperation in the region. • European Union – Community of Latin American and Caribbean States **(EU-CELAC)** Platform: an information and communication site for funding agencies, universities, research centres, enterprises and individuals interested in the bi-regional cooperation European Union – Latin America and Caribbean on Research and Innovation.	**Sources**: Knowledge Resources: IPCC (link) Knowledge Resources: PRIMA (link) Knowledge Resources: SESAME (link) S4D4C Online Course - Module 7 - SESAME (link) S4D4C Case Study: SESAME (link) Knowledge Resources: EU-CELAC (link)
Thematic Approaches (some examples)	
Water diplomacy can be defined as the use of diplomatic instruments to existing or emerging disagreements and conflicts over shared water. Different scientific disciplines (such as hydrology, physics, ecology, and the social sciences) devote more attention to water diplomacy. This field will remain important in the future and we recommend that you include examples of water diplomacy in your training course (if adequate).	**Sources:** S4D4C Online Course – Module 5 (link) S4D4C Case Study: Water Diplomacy (link) S4D4C Online Course – Module 7: Open Science (link)

Possible subtopic	Source/Training material
Global **Health diplomacy** is the practice by which governments and non-state actors attempt to coordinate global policy solutions to improve global health. In particular, the COVID-19 crisis shows us how fragile and sensitive our living environments are. We have learnt that the creation and transfer of scientific knowledge are critical to building and sustaining socio-economic welfare and integration in the global economy. This example should not be missed in your training. Following the call for "Open Science, Open Innovation, and Open to the World" by the EU Commissioner for Research, Science and Innovation Carlos Moedas in 2015, we looked for applications and implications of **Open Science** in SD. Foreign policy actors need tailored information and training about Open Science in order to understand the potential both for their own interests and for the advancement of international scientific cooperation and innovation. Open Science is key for addressing international emergencies and tackling of other societal challenges.	S4D4C Case Study: Open Science (link) Please check also the other S4D4C case studies: Some of the topics might also be interesting for your SD training course. (link) Open Science Diplomacy to tackle the COVID-19 pandemic (link) **Training materials:** We recommend checking the following presentations: • Water diplomacy (link) • Health diplomacy (link) • Open science (link) Infographic: Strengthening science diplomacy to tackle global challenges together – the case of the COVID-19 pandemic (link)

Source: Authors' compilation/S4D4C

4. Skills/Career Development

SD encompasses a spectrum of roles and includes professionals who perform a range of activities and practices, from promoting international cooperation in science from an embassy, to providing scientific advice to a foreign minister, negotiating a multilateral agreement, or navigating scientific collaborations between countries under political strain. We can also distinguish between "institutionalised" and "non-institutionalised" positions. One of the major challenges is that there is not yet an educational or professional pathway for those kinds of professionals.[5]

The first step towards building SD skills is to create awareness about the different worlds of science and diplomacy. It is recommended always including skills-building exercises and experiential learning on topics like negotiations and intercultural communication in all training activities.

Table 4: Skills

Possible subtopic	Source/Training material
Differences between Scientists and Diplomats	
As former Canadian diplomat Daryl Copeland describes in his book "Guerrilla Diplomacy: Rethinking International Relations", while scientists are risk-taking and guided by creativity and experimentation, based on facts and data, the diplomats are risk-averse, guided by protocols, norms and strategies, negotiating and influencing others. Before starting your training on skills, we recommend a short introduction on the two different worlds. Your trainees should be aware of the differences and biases due to their own background.	**Sources:** S4D4C Online Course – Module 6: Science and Diplomacy: Two Different Worlds? (link) Copeland, Daryl (2009): Guerrilla Diplomacy: Rethinking International Relations. Boulder: Lynne Rienner Publisher. ISBN: 978-1-58826-679-8 (link) **Training material:** Please see some slides of the presentation "Introductory-Presentation" (link)

[5] Sources: S4D4C Online Course – Module 6 (link), Melchor L, "What Is a Science Diplomat?", The Hague Journal of Diplomacy, 15(3) (link), and Mauduit JC, Gual Soler, M. "Building a Science Diplomacy Curriculum". Frontiers in Education, 5: 138 (link)

Science Diplomats: Taxonomy, Skills depending on background	
In his article "What Is a Science Diplomat?", our S4D4C colleague Lorenzo Melchor elucidates the role of science diplomats, offering a typology of "institutionalised" and "non-institutionalised" positions, a toolbox set of knowledge and skills, and a set of challenges and recommendations to work in this complex interface of science and diplomacy. Within the "science diplomat's toolbox", he differentiates among two main categories: knowledge and skills. Scientists need a deeper training in understanding the international policy landscape, negotiations, narrative and writing skills, intercultural sensitivity and public relations. In contrast, diplomats should improve skills to adapt to scientific uncertainty, scientific literacy and credibility. Our S4D4C colleague Marga Gual Soler co-authors a paper presenting a curriculum framework for teaching science diplomacy to both groups of scientists and diplomats and offers a catalogue of topics and courses from which you can build a SD syllabus.	**Sources:** Lorenzo Melchor (2020): What Is a Science Diplomat?, The Hague Journal of Diplomacy (link) Mauduit JC, Gual Soler, M. (2020): Building a Science Diplomacy Curriculum. Frontiers in Education,5:138 (link) S4D4C Online Course – Module 6: Final Consideration: It's not only about Soft Skills! (link)
Negotiation Skills	
In international diplomacy, negotiation consists of discussion between officially designated representatives. Their aim is to achieve a formal agreement between their governments to a way forward on an issue that has come up in their relations or to establish a multilateral agreement or treaty on a particular topic. General rules for preparing negotiations include problem analysis to identify joint interests, determination of goals, active listening, clear communication skills as well as ethics and reliability. The best way to learn and practice negotiation skills is to engage in simulated experiences like role-playing mock negotiations.	**Sources:** S4D4C Online Course – Module 6: Negotiation skills (link) Harvard Negotiation Method (link) **Training materials:** S4D4C Presentation on Negotiation Skills (link) Mercury Game, Massachusetts Institute of Technology (MIT) (link) S4D4C Simulation Exercises: • Global Health and Science Diplomacy (link) • Solar Radiation Management (link) • Joint Programming: European Commission and five fictitious countries (link)
Intercultural Communication	
Intercultural communication competence describes a range of cognitive, affective, and behavioural skills that lead to effective and appropriate verbal and non-verbal communication with people of other cultures. Different socio-cultural dimensions like collectivism and individualism also play an important role in the SD world.	**Source:** S4D4C Online Course – Module 6: Language and Intercultural Communication (link) S4D4C Online Course – Module 5: Regional and National Science Diplomacy Strategies (link)

Source: Authors' compilation/S4D4C

Our experience shows that a good way to teach SD skills is to invite experts dealing with SD issues to present their work. Also, questions related to career paths and career development seem very important for trainees. With the aim of showing the variety of professional development, we recommend that you plan roundtable discussion (see Training Material: Careers in Science Diplomacy Roundtable (link)) or several single presentations of suitable SD experts (see Training Material: Presentation on Careers in Science Diplomacy (link)) in your SD training course.

Part 2: Training Formats

Language, Content and Formulation

A learning objective should describe what students should know or be able to do at the end of an SD training course, something they did not know or weren't able to do before. At first glance, learning objectives can be described in very general terms. Your intention may be, for example, to decrease the existing unconscious bias or stereotyping that scientists might have about diplomats and vice versa, or to improve the negotiation skills of professionals at the SD interface. But this very general expression does not yet contain any information on how the objectives will be achieved and exactly which competences are gained by reaching the objectives. Learning objectives or outcomes are closely related to terms like knowledge, skills and competences, but some helpful distinctions can be made.

Principally, most of the theoretical approaches in learning theory and didactics prefer speaking of a competence-orientation in the design of a learning curriculum. Skills are understood as the abilities of an individual. They can be based on the professional knowledge of a scientist or a diplomat, for example, that was acquired through studies and work experience.[6] In our understanding, competences can still be distinguished: "Competence can be understood as actually achieved learning outcomes, validated through the ability of the learner to autonomously apply knowledge and skills in practice, in society and at work"[7]. This means that one can be rich in skills but still unable to instruct others or apply the skills in an emerging situation with hitherto unknown conditions for action.

If you begin planning the SD training course with the learning objectives, it will help ensure that all activities are competence-oriented and support trainees in achieving the objectives.

We start from the following general outlines:

1. **Identify the needs of your trainees:** As part of your planning you need to decide what the attendees of your SD training need to know or be able to do after they have taken the course.
2. **Formulate your learning objectives understandably:** All trainees will have to be informed about the content of the training course, the materials and (if adequate) the methods used, and the learning objectives that they are supposed to achieve.
3. **Keep the formulation short:** Learning objectives must be brief, clear and specific. They are statements of what trainees will be able to do at the end of the SD training course as a result of the training and learning activities that have taken place. They thus should be related to specific content of SD.
4. **Be clear on how the objectives will be reached:** The learning objectives should indicate how the different training elements (media, materials, type of interaction, etc.) combine to meet the needs of the trainees. Your approach should integrate practical exercises, group work, etc. to help them reach the objectives.

The trainees develop the ability to apply new knowledge and skills according to their own dispositions and their

[6] See, for example, the approach of Jean-Christophe Mauduit and Marga Gual Soler in "Building a SD Curriculum", in Frontiers in Education, 11 August 2020. They differentiate content-based and skills-based knowledge, depending on the individual back ground of the trainees. Online available (link).

[7] Cedefop (2017). Defining, writing and applying learning outcomes: a European handbook. Luxembourg: Publications Office, page 31. Online available (link)

abilities that already existed beforehand. The trainer provides them with the necessary means to reach the next stage of their development. This way of perceiving the process of learning is what is called a student-centred approach. The learning process will be most beneficial for a trainee if he or she has already been able to gain experience during the process that directly ties in with the trainee's existing skills. Previous experience of a scientist in negotiations, for example, can be brought directly into diplomatic negotiations and thus make sense to the trainee. For this kind of access to the learning process, experiential learning is best suited. Therefore, an interactive curriculum design using role plays and simulations can be very effective (see Table 4: Skills). Clear learning objectives will support and foster the learning process from the very beginning. The thematic blocks suggested in the previous chapter will help you to define one or several learning objectives of your SD training course.

Some short theoretical observations will follow in order to help you define the objectives. The objectives are typically ranked according to the level of their complexity. At least three levels can easily be distinguished: 1) the acquisition of new knowledge on a certain subject (knowledge), 2) the ability to apply this knowledge functionally in a certain context (function), and 3) the capacity to use one's own abilities in a newly emerging situation in a solution-oriented way (transfer). Additionally, learning objectives can target different dimensions of everyday professional activities. In this regard, the differentiation is often made between a) cognitive, b) affective and c) behavioural skills. A cognitive skill would be, for example, the ability of a scientist to present an easy-to-understand speech on a complex topic to a non-scientific audience like policy makers and diplomats. Affective skills are shown, for example, when someone stays friendly even when being personally attacked during vigorous negotiations.. A behavioural skill can be stated in a situation where someone is asked to step outside their cultural comfort-zone, an invitation to eat unknown local food, for example, and shows a confident behaviour in dealing with the situation – well known circumstances while dealing with international collaboration.

The formulation of learning objectives regularly follows the systematics of a taxonomy, where each objective targets a specific field of competence. By using the levels and the dimensions that we have just mentioned, the following systematics can be drawn:

Table 5: Basic Systematics for the Formulation of Learning Objectives

	Knowledge	Function	Transfer
Cognitive			
Affective			
Attitudes			

Source: Authors' compilation/S4D4C

Typical for the upper left corner of this systematics is a learning objective formulated like this:

> *After the successful completion of the training course, i.e. by reading a series of best practice case studies, trainees will be able to present some critical factors for successful SD.*

For the lower right corner, we can suggest a learning objective like this one:

> *Through simulations and role-plays, the trainees will be able to generate and offer a sustainable solution even in a controversial situation of SD.*

Here are two more typical examples that you may regularly find in the centre part of our systematics:

> *After the successful completion of the training course trainees will be able, …*
> *…through interactive exercises, to successfully apply the new knowledge in specific negotiation settings.*
> *…to discuss and classify different cases of multilateral debates in the context of SD.*

There are different models for the formulation of learning objectives. Typically, verbs are used that explicitly express what the trainee will be able to do after the training course, e.g. "The trainee will be able to present, explain, analyse, apply, propose, etc." Here we have used a relatively open system. It allows us to adapt the learning objectives to the specific needs of your SD programme and your trainees. The more knowledge and practical experience the trainees already have (e.g. science attachés), the more ambitious will naturally be the objectives they will strive for in the SD training course.

Multiple Learning Outcomes and Strategic Analyses

The learning objectives normally represent the first step in planning a training course. But they are not the only factor that has to be taken into consideration. It is necessary to have a clear picture of the surrounding framework conditions as well (see the next sub-chapter on page 16):

- target group,
- duration,
- eligibility,
- budget,
- delivery.

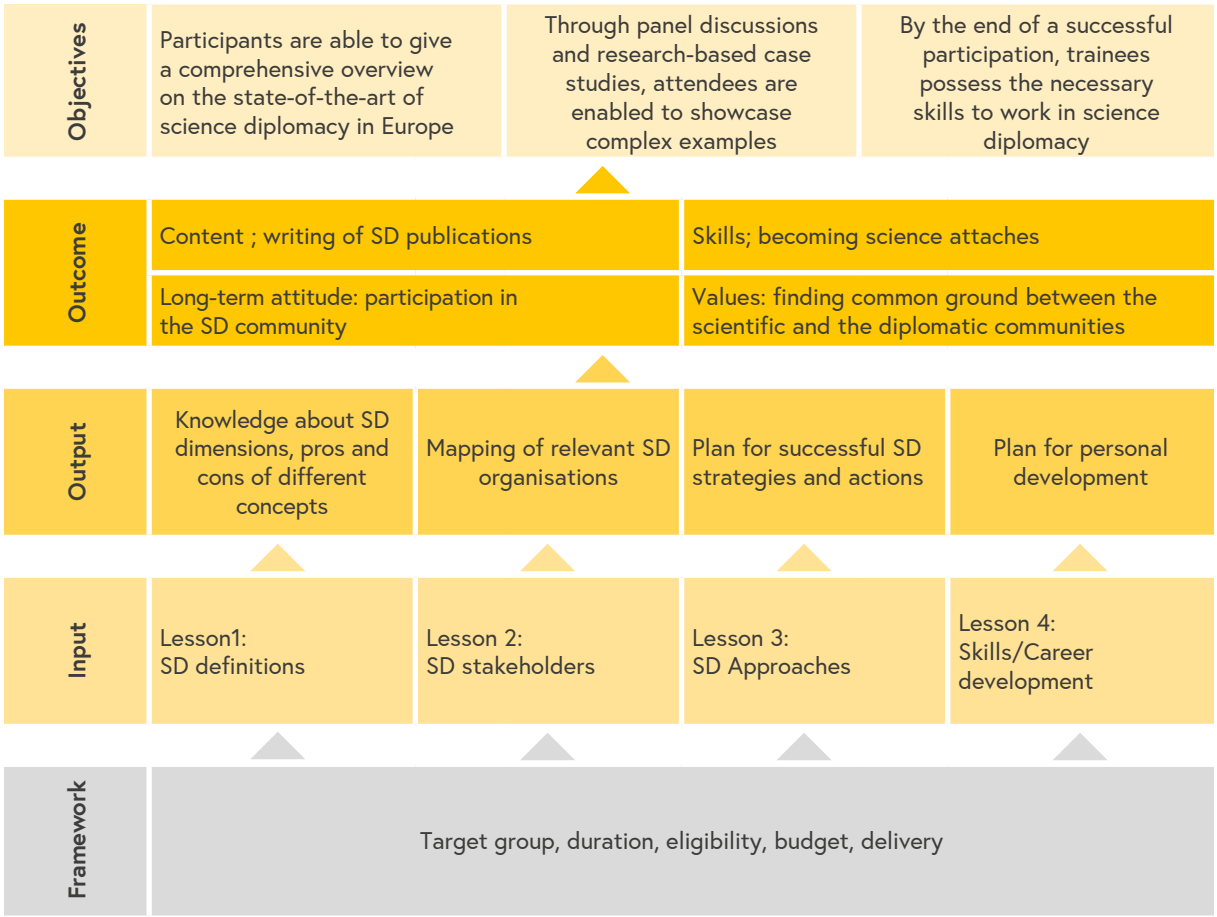
The objectives and the framework conditions constitute the foundational basics for the programming and design of your SD training. You may systematically derive from these basics the details of your planning, e.g. which aspects you will consider when choosing specific actions and topics (based on the content suggestions in Part 1). In chart 1 below, we systemise the targeted results by distinguishing possible short-term (output) and long-term (outcome) results of SD training courses.

You can see this as an example of how to plan your training course effectively.

With regard to short and long-term results, your SD training course will certainly have multiple outputs and outcomes. They can be targeted by clearly formulating the objectives and having a competence-orientation in view, e.g. by addressing specific fields of work in SD. With regard to the outcomes, we suggest differentiating a) content, b) skills, c) attitudes, and d) values of scientists and diplomats – the trainees involved in your activity:

- **Content**: By the end of their training course, trainees will be able to categorize three dimensions of SD, following the definition of The Royal Society: science in diplomacy, diplomacy for science and science for diplomacy (output).[8] In the long term, they might be able to write critical articles about the definition and common understanding of SD, which is one of the more ambitious learning objectives (outcome) (see Part 1: 1. Science Diplomacy Definitions).
- **Skills**: By the end of the training course, students will know which career steps they might take to become engaged in SD (output). In the long term, they may be interested in deepening their skills and starting an SD career. The aim is that scientists gain SD competences to improve working with diplomats, and vice versa (outcome). (see Part 1: 4. Skills/Career Development)
- **Attitudes:** By the end of the training course, your trainees will be able to better understand the interests and world views of scientists and diplomats dealing with SD (output) and to explain the resulting differences in the communication styles of both groups in different countries and regions. In the long term, they could build bridges between the two worlds (outcomes). (see Part 1: 2. Science Diplomacy Stakeholders and 4. Skills/Career Development)
- **Values:** By the end of this training course, participants will be able to give examples of successful SD approaches (output). In the long term, the students could find a common ground between the scientific and the diplomatic communities (outcome). (see Part 1: 3. Science Diplomacy Approaches)

Chart 1: Outputs and Outcomes of SD Training Courses



Source: Authors' compilation/S4D4C

[8] Cf. New frontiers in science diplomacy. Navigating the changing balance of power. Published by The Royal Society. January 2010. Online available (link).

The inputs that are shown in the chart - SD definitions, SD stakeholders, SD approaches and skills/career developments - are a non-closed list of what can or ought to be offered to the participants (see Part 1). The list is optional, of course, because there are multiple training possibilities and purposes in the field of SD. In principle, the content should be appropriately chosen in order to serve the objectives that you as a trainer have defined beforehand.

Some criteria for successfully achieving the outcomes can be negotiated with the students. This will deliver a clear picture of what the needs of the trainees are, what exactly they are heading for and why they have chosen your SD training course. This will be helpful for you as a trainer, too, of course.

How do you choose the most suitable format for your science diplomacy training course?

The process of defining the learning objectives of your SD training course is closely aligned to the decisions on which formats you will choose or design. They ought to be conducive to making trainees reach the objectives. Still, the setting of the training course depends on a series of preliminary conditions (target group, duration, etc). The following tables might help you in planning the details of the SD training course.

1. Target Group

The target audience and their needs are crucial aspects of your preparation. You have to consider prior knowledge and skills, special interests, biases, behaviours, and motivations for attending. The number of participants and how they will be involved in the different activities are also further aspects you may want to think about.

Table 6: Target Group

Differentiation	Possible Target Group	Advantages/Disadvantages	How/When to use
Country/ region of origin	National only	**A:** Focus on national discussions, better framing of instruments, potential to grow better connections within and between national stakeholders, native language **D:** Discussion around national science policies may shift the focus, engagement between state and non-state actors may be more rigid due to national context	If the SD training course aims to raise awareness and foster networks across national stakeholders, with the potential of promoting national SD strategies or capacity building exercises.
	EU only (one region only)	**A:** Common knowledge about European/regional SD, European/regional values and EU instruments **D:** Limited possibility to create new approaches, especially related to global aspects	If your training course seeks to deepen knowledge on SD of a specific country or geographically delineated region or coordinate and evaluate regional approaches, focusing on the participants from the region can avoid unnecessary context-setting and save time.
	EU and non-EU (cross-regional)	**A:** SD is an international approach, related to solving global challenges **D:** Very broad discussion, different aspects (also cultural) to be considered	If the training course focuses on global issues (see the thematic approaches in Table 3: SD Approaches), participants from different regions should be involved. Depending on the duration, the selected topics ought to be as focused as possible.
Career stage	Students/beginners	**A:** Assume no prior knowledge or exposure in SD, wide range of possible topics for consideration (see suggested content in Part 1) **D:** Steep learning curve, requires detailed context-setting	Early exposure to SD enables integration and mindset shift from early on in their careers. Your training will focus on basic awareness of SD and on developing basic as well as specific skills.
	Professional/advanced	**A:** Possibility to focus on concrete country/regional or thematic approaches (see Table 3: SD Approaches), neglecting the basics of SD **D:** Challenging selection of participants with shared interests	Training advanced experts often allows you to deepen knowledge in concrete topics, such as SD in climate, ocean or health issues. Also, this is a chance to offer SD "train-the-trainer" seminars which aim to increase the number of trainers due to the growing demand for SD training at EU and global levels.

Differentiation	Possible Target Group	Advantages/Disadvantages	How/When to use
Number of participants	Small group (< 40 participants)	**A:** Small group facilitates interaction between all participants via working groups/ breakout sessions, networking (see Table 4: Skills) **D:** Large volume of applications can be time-consuming and requires strict selection criteria	Interactive SD training courses in person which include simulation games, brainstorming exercise or visits[9] to international organisations can only be done with a small number of participants. The focus may lie on long-term networking and personal exchange among the participants as well as with external experts.
	Unlimited number of participants	**A:** Reaching a broad audience (especially virtually) **D:** Reduced interaction among participants	SD training courses with many participants (e.g. if there isn't any pre-selection) are mainly done via online settings. They might focus on a more general theme with a focus on SD presentations and lectures. Some degree of interaction can be achieved using online poll tools and other virtual instruments, e.g. to have break-out groups.

Source: Authors' compilation/S4D4C

[9] See S4D4C Training materials: Study Trips (link)

2. Duration

Depending on the time availability for your SD course, there are different training formats that you can use:

Table 7: Duration

Duration	Possible Format	Advantages/Disadvantages	How/When to use
Single 1-2 hour training session	Such a session can be part of an SD or international conference, thematic workshop or just a stand-alone seminar (offline or online) dedicated to SD basics or one of its aspects.	**A:** Reaching a pre-selected target group, quick insight in a topic, easy to trigger further interest. **D:** Staying on the surface, no time for deepened interaction; if the session is embedded in a larger conference/ thematic workshop, its topic strongly depends on the general setting of the event	To draw attention to special topics or to SD generally, a short training session arouses interest. This kind of training (in combination with further training offers) may serve as an introduction to what your trainees can still learn (e.g. SD definitions and stakeholders in an introductory training course; SD approaches and skills in an advanced training course).
Single 2-5 day course	Such a training course can be organised online or offline. It includes different topics and interactive elements.	**A:** Excellent for pre-defined and pre-selected target groups, good networking possibilities, chance to offer deeper knowledge and cover several SD aspects and skills building **D:** Time-consuming evaluation of applications, logistics, involvement of facilitators and complex coordination.	This format of training courses is widespread and advantageous. We had a good experience with a pre-selected small group of participants (<40) in an in-person training course that allowed intensive interaction and exchange among experts and students. You may need extensive planning and experienced facilitators, though.
Course series	A course series could be organised online or offline or in a hybrid mode. Depending on the objectives and the content it can include several 1-2 hour sessions or 1-3 day courses.	**A:** Teaching modules that build upon one another (see different subtopics in Part 1), spread topics over time, help build a network of peers **D:** Scheduling, preparation and delivery can be more challenging to coordinate than one-off offerings; attendance can drop after initial sessions	If you offer a university course, it may take place during the holidays or summer. A teaching team and guest lecturers might facilitate the organisation of such a series.

Duration	Possible Format	Advantages/Disadvantages	How/When to use
Semester course	A semester course on SD for academia (with ECTS-Credit Points being awarded) could be embedded in an academic curriculum (each semester a series with lessons) or established separately as a postgraduate course or an M.A. programme (2 or more semesters).	**A:** SD has the potential to become an academic matter, e.g. because of the trend in favour of transdisciplinary academic careers; SD can be a springboard for career development in diverse directions **D:** Infrastructure is needed, the preparation and coordination of an academic programme takes a substantial effort, administrative and academic framework conditions will have to be respected	If you are planning to run an SD academic programme, you have to build an SD team supported by one or several institutions. An SD course (each semester) might be integrated in academic disciplines like "International Relations", "Political Sciences", "Cultural Diplomacy", "Science, Technology, and Society Studies", "Public Administration" as well as science, technology, engineering and mathematics (STEM) degrees.

Source: Authors' compilation/S4D4C

3. Eligibility

Generally, courses can be offered either for pre-selected participants only or on a "first come, first served" basis. This decision is strongly related to the size of your training activities: if you offer a small group training course (see Table 6, Number of Participants), you need a preselection of participants. The table below indicates selection procedures as well as pros and cons, according to different settings.

Table 8: Selection of Participants

Settings	Selection	Invitation	Advantages/ Disadvantages	How/When to use
Open participation (large size events)	No pre-selection needed; an announcement of the SD training course with a link to registration and agenda description is sufficient. Depending on your objectives and the content offered the target group is defined in the announcement (see Table 6).	Broad dissemination across newsletters and social media or educational materials. The trainees sign-up by themselves; no personalised invitations and intensive interaction between trainees and trainers	**A:** Awareness of the topic within an unlimited number of participants; easy logistical preparation **D:** With a high number of participants, only little personal interaction is possible; topics are only handled superficially.	We recommend offering "open participation" in virtual SD training courses. Generally (offline or online), we suggest limiting the participants' number to 200-250 persons (first come, first served). A training course with more than 250 persons is feasible, but trainees will have limited interaction if any.

Settings	Selection	Invitation	Advantages/ Disadvantages	How/When to use
Selected participants only	A call for application is published. Selection criteria are clearly defined and number as well as role of possible participants are communicated transparently. If possible, independent reviewers facilitate the selection. The selection procedure depends on the target group (see Table 6).	Personalised invitation with logistical advice and dissemination of pre-teaching materials. If possible, have an exchange between participants and trainers before starting the training course (e.g. virtually)	**A:** Personal interaction, deepening SD knowledge, selection based on the criteria that there is a maximum of heterogeneity. **D:** Complex logistical preparation.	Especially for a 2-3 day training course or long-lasting academic programmes (see Table 7) we recommend pre-selection of the participants. The stronger the trainees feel as a team the more they are ready to learn and engage with the training activities. In our experience the networking aspects in SD training courses are valuable for the participants.
Participation by invitation	Specific group of participants needs to be identified.	Invitations via direct mailing. Participants need to confirm their attendance or suggest another representative from their organisation	**A:** Participation by invitation gives you control of who attends the course in the end, targeting specific groups **D:** Time-consuming, as follow-up is needed	Useful if you want to address a specific target group in a small course setting

Source: Authors' compilation/S4D4C

4. Budget

The ability of trainees to pay a fee strongly depends on their career stage and financial means. Organisations with external funding could give scholarships e.g. for Global South participants and underrepresented groups, depending on the respective mission of the SD course and host organisation.

Table 9: Selection of Participants

Point of View	Examples
Trainer	**You work for an organisation/university which receives dedicated funding for carrying out SD training courses.** In this case training activities could be offered free of charge. The objective could be to increase the awareness of the importance of SD for early-career scientists while offering a new academic programme.
	You or your organisation are/is (fully or partly) supported by third-party funding with the mandate to offer SD training activities. The S4D4C project for example is funded by the European Commission. Therefore, training activities have been mainly offered free of charge for participants. If the budget is insufficient, trainees could cover a portion of their costs, e.g. travel costs.
	You are a fee-based organisation depending on revenue from your trainees. Calculate your costs, expenses, staff salaries, speaker and trainer fees, etc. for a minimum number of participants.
Trainees	**Your target group includes mainly students/beginners.** Usually, students are interested in events free of charge. If this is your target group, the costs per trainee should be covered by the internal budget of the organisation or further institutional funding. If there is no chance for institutional support and trainees have to pay a fee (at least partly e.g. travel and accommodation costs), we would recommend that you offer at least some scholarships.
	Your target group includes mainly professionals/advanced learners. Professionals/advanced learners with a strong interest in SD are mostly located in international organisations, national ministries, research institutions and universities, usually with a professional development budget. They would usually be open to paying for the course from a leading organisation and for the opportunity to network with high-level professionals.

Source: Authors' compilation/S4D4C

5. Delivery

Online delivery is cheaper and more flexible compared to the traditional in-person training course, allowing for more diverse and inclusive audience participation, and supporting the work-life balance of trainees. However, face-to-face courses do not only allow students to have a one-on-one experience with the trainer and invited experts, but also expose them to practical skills that can be beneficial to their future career and provide a unique opportunity to build a network with their peers. Each of these training options come with pros and cons which you want to consider in your planning. It is all about finding an option that works best for you, the identified learning objectives and trainee needs which you have defined.

Table 10: Course Format

Differentiation	Possible Format	Advantages/Disadvantages	How/When to use
In-person	When you plan an in-person training course, you should consider all aspects described above (see Tables 6-9).	**A:** Personal interaction, peer learning as well as learning to deal with differences in culture, language and negotiations **D:** Costs (especially travel and accommodation) of in-person international training are very high	If building an SD community is one of the main objectives of the training, we recommend in-person training. The setting could also be used as an introductory training course e.g. for an online seminar series. We also suggest in-person training courses back-to-back with larger events e.g. international conferences to save costs (e.g. travel costs).
Hybrid	Online and face-to-face	**A:** Combination of personal interaction and online learning depending on topics and training objectives **D:** High coordination effort	If you offer a course series, hybrid training can be a suitable format. As a trainer you have to carefully define which topics need intensive interaction (e.g. exchange with SD stakeholders or simulation games) and which training material is suitable for using online only (e.g. papers, videos).
Online	Videos or podcasts	**A:** Available anytime **D:** No interaction with authors and experts	Online training activities involve many time-consuming technical issues, but a combination of already available software and tools can facilitate your training course. We recommend the combination of all three categories of online training listed on the left.
	Workshops	**A:** Interaction with speakers depending on setting (number of participants, technical setup) **D:** Detailed preparation of each step, technical issues	
	Self-learning course, e.g. MOOC	**A:** Available anytime, sustainable use **D:** Limited interaction with authors and experts, complex preparation	

Source: Authors' compilation/S4D4C

What methods work best?

The successful dissemination of knowledge and development of practical skills in a highly interdisciplinary field such as SD demands a wide array of complementary training methodologies. To cement the newly acquired knowledge and skills, a multidimensional set of methods is recommended. When developing the S4D4C courses, we distinguished between four types of training material[10]:

1. Knowledge transfer
The primary step in every training module needs to be the transfer of knowledge, namely the provision of basic information and the theoretical background necessary to grasp the wider connotations of a specific subject. Also, in the case of SD, being familiar with the theoretical underpinning considerably facilitates the absorption of knowledge in more practice-oriented settings. Here you could consider presentations and scientific papers introducing all four thematic blocks mentioned in Part 1: SD Definitions, SD Stakeholders, SD Approaches and Skills/Career Development.

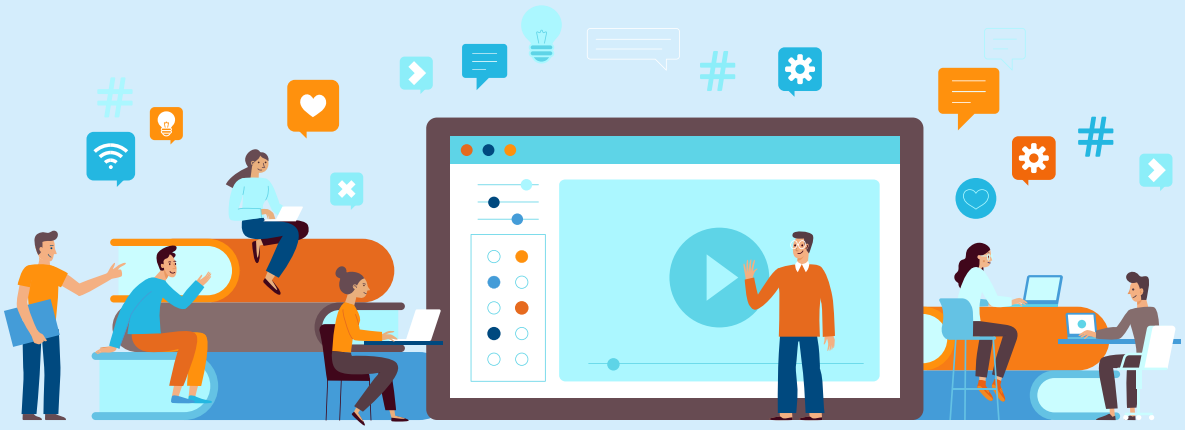
2. Knowledge exchange
Following the transfer of basic knowledge, it is thus important to initiate some form of exchange to enable participants to freely reflect on the presented material, to pose open questions, and thereby to deepen their understanding of science diplomacy. On the one hand, there must be the possibility of an information exchange between the participants themselves. This will put different opinions, mind-sets and ways of thinking on the table and thus enrich the participants' overall perception of SD. On the other hand, participants should be brought together with actual practitioners and experts, thereby further clarifying how SD can be applied in real life. The chance to conduct effective and less rigid networking is an added bonus – for in-person as well as for online SD training. In particular, science attachés and science advisers to foreign ministries could be invited to interact with the SD trainees. Depending on your training format you could consider a (personal) presentation of their profiles or (video-) interviews. They could illustrate best how SD works in practice.

3. Knowledge Application
When the basic knowledge has been conveyed, it is important to apply it – preferably interactively. Relevant exercises could enhance the participants' interest in SD as well as provide them with more practical problem awareness, enable them to develop relevant strategies, test them and receive feedback. These could be done e.g. with simulation games in which difficult political relationships could be improved via negotiations among SD stakeholders (see Table 2). We have had good experiences with visits to embassies (e.g. Spanish Embassy in London), international organisations (e.g. United Nations, European Space Agency) or ministries (e.g. Ministry for Education and Research in Germany).

4. Knowledge Consolidation
The most fundamental features in developing any cognitive architecture are memory and learning. When the content is learned by repetition (e.g. SD quizzes), it is remembered better and retained for a longer time. If possible, the revision could be combined with a reward component, visualising questions and including a fun factor could help too. If you plan a series of (in-person or online) SD training courses, a repetition in each event could also be arranged.

Whereas each one of those objectives will be insufficient for efficient preparation of science diplomats, it is their combination that accounts for an efficient and lasting training experience.

[10] Please consult the S4D4C website for concrete suggestions of training materials (link)



Part 3: In-person Training

How do you design the programme?

In this sub-chapter, we suggest some basic considerations when designing and preparing an SD in-person training course. The recommendations are as based on our experiences – many variations are certainly possible (regarding framework conditions such as target group, duration, budget etc., see also Part 2).

Table 11: Aspects to be Considered When Designing an SD Training Course

Definition of Framework Conditions		Arguments/Recommendations
Objectives	• To expose/ introduce participants to science diplomacy. • To explore key science diplomacy issues, topics and opportunities relevant to a particular world region, sector or theme. • To present/introduce science diplomacy examples, case studies and experiences in the various forms that they take (or have taken in the past). • To help scientists understand the world of diplomacy and vice versa (for mixed groups). • To develop skills for navigating the SD interface. • To build networks between organising institutions, speakers and participants. • To develop new ideas and strategies to enhance SD and foster the next generation of science diplomats.	We recommend covering all three levels of training objectives: knowledge, function, transfer (see also Part 1, Table 5: Basic Systematics for the Formulation of Learning Objectives).

Definition of Framework Conditions		Arguments/ Recommendations
Target group	Combination of • Scientists • Policymakers and diplomats • Representatives from NGOs, industry, and other sectors working at the science-diplomacy nexus	We have had good experiences with a mixed target group as transdisciplinarity is very valuable for SD training courses in order to communicate clearly and effectively and increase mutual understanding on the interface between science and foreign relations. Additionally, please check the advantages and disadvantages of further formats in Table 6: Target Group.
Duration	4-5 days	Based on our experiences this format allows enough time for interaction and networking among the participants. Other options are presented in Table 7: Duration.
Number of participants	< 40 participants	Our experiences have shown that the group should be no larger than 40 to facilitate networking and the establishment of lasting links between participants. Alternatively, please check other options in Table 6: Target Group.
Location	A secluded/retreat location	This allows for full immersion and networking as participants stay in the same place and spend all days together, including downtime. A pleasant atmosphere facilitates the working climate.
Format	Combination of different materials and formats	Think about lectures, panel discussions, ice-breaking sessions, simulation games, interactive case studies, open roundtables, and group projects. It is also advantageous, if the training course takes place near popular SD facilities (e.g. large-scale infrastructure) or SD players (e.g. UNESCO) which allow visits and further exchange. (See also recommended S4D4C training materials in Part 1 and on the S4D4C website (link))

Source: Authors' compilation/S4D4C

Phase I: Planning and Organising

Which roles and responsibilities are helpful?

According to the S4D4C experiences it might be useful to begin the organisation of an SD course with the establishment of three groups that have dedicated responsibilities:

- ✓ **Planning group** in the organising institution that develops the agenda, publishes the call for applications (based on input from the advisory group) and takes care of the logistics.
- ✓ **Advisory group** of experts in different SD areas to be consulted about the priority topics and themes to be covered in the course and make recommendations. This group could include different SD stakeholders and representatives of SD networks e.g. from ministries, international organisations etc. (see Table 2: SD Stakeholders and Networks).
- ✓ **Review and selection committee** of external SD experts (and alumni if it is a recurring course) and organising institution to review and grade applications. The constitution of the committee depends strongly on the objectives and the setting of your target group: If you invite mainly diplomats, representatives from diplomatic academies, scientific advisors or policy stakeholders, might be suitable experts. If you focus on scientists, your committee could include experts from science academies and foreign offices of research as well as national, regional or international organisations. Suitable partners are also available at the S4D4C Knowledge Resources Platform (link)). If the budget permits, a small honorarium can be provided to external reviewers in return for their work.

How long does the planning cycle take?

The full course planning cycle takes at least 6-7 months, often more as many participants and speakers require visas for international travel.

Table 12: Possible Planning Cycle for an SD Training Course

Timeline (months before event)	Resources needed	Tasks for organisers	Roles Planning group Advisory group Review and selection committee Participants
7 months	10 working days	**Design/Framework/Format:** • Objectives • Target group • Budget/fee • Human Resources	**Planning group**
6.5 months	10 working days	**Launch call for applications:** (Deadline: 1 month) • Draft call for applications • Request input from partners and experts • Final version of call for applications • Communication and dissemination	**Advisory group:** Input and recommendations concerning draft call **Planning group:** Communication and dissemination via different channels (e.g. social media, events) **Participants:** Preparation of applications; submission
	3 working days	**Identification and invitation** of potential speakers	**Planning group** **Advisory group**
5.5 months	12 working days	**Close call** for applications **Eligibility check**	**Planning group**
	2 working days	**Second round of speakers` invitations** (if needed)	

Timeline (months before event)	Resources needed	Tasks for organisers	Roles Planning group Advisory group Review and selection committee Participants
4.5 months	2 working days 2 working days 2 working days 8 working days	• **Evaluation** of applications • **Final list** with speakers • Preparation of **agenda** • Preparation of **background readings**	**Review and selection committee** **Planning group**
4 months	5 working days 1 working day 8 working days	• **Communication** of list with selected participants: website, letters of acceptance • **Final agenda** • Preparation of **speakers' briefing and logistics notes**	**Participants:** 1 week to accept the invitation – confirmation of participation **Planning group:** Preparation of pre-teaching materials
3 months	20 working days	Visa, travel and other **logistical arrangements**	**Planning group** **Participants**
2 weeks	2 working days	**Send out** • Agenda • Logistics note • Background readings • Speakers briefing	**Planning group:** Sending out pre-teaching materials to participants

Source: AAAS-TWAS, internal paper "Organizing a Science Diplomacy Course: Guidelines for Local Partners and Host Organisations", adopted by S4D4C

Phase II: Design, Development and Delivery

How do you build an agenda for a 4-5 day day in-person training course?

For a typical 4-5 day course, we recommend including the following core elements into the agenda:

- ✓ A setting-the-scene session and introduction to SD. (see Part 1: 1. Science Diplomacy Definitions)
- ✓ Contextualisation of SD to the region/theme/field of research or policy domain/institutional context, etc. (see Part 1: 3. Science Diplomacy Approaches)
- ✓ Lectures and panel discussions. (see S4D4C Training Materials (link))
- ✓ Skills-building sessions on communication, negotiation, leadership, policy, etc. (see Part 1: 4. Skills/Career Development)
- ✓ An experiential learning/simulation game to put the concepts learned into practice. (see e.g. S4D4C Simulation Exercises: Global Health and Science Diplomacy (link) and Solar Radiation Management (link))
- ✓ A short reflection/discussion at the end of each day and a final debrief session.

Optional (but valuable) elements include:

- ✓ Cultural activities and field trips for networking and bonding between participants. (see S4D4C Training Materials: Study Trips (link))
- ✓ Icebreaking exercises and networking exercises throughout the course. (see S4D4C Training Material: SD Bingo (link))

Please note: These elements are certainly not only valid for in-person training courses but might be beneficial in online classes as well. For additional information see also Part 4: Online Training Courses.

In order to ensure a nice learning experience for the participants, Table 13 provides you with a blueprint on how to mix the above mentioned elements in a way that makes each training day a nicely digestible unit. Each additional day deepens the understanding of SD by giving more content and context and completing aspects that have been dealt with before. You could use the SD curriculum in Part 1 to plan your topical sessions.

Table 13: Blueprint for a 5-day In-person SD Training Course (based on S4D4C training experiences)

	Day 1	Day 2	Day 3	Day 4	Day 5
9-10:30	Opening + keynote	Topical session	Topical session	Simulation game/ interactive case study	Topical session
10:30-12	Intro to SD + contextualisation	Topical session	Topical session		Careers in SD
Lunch					
14-15:30	Topical session	Skills building exercise	Topical session	Debrief game	Debrief + evaluation
15:30-17	Topical session		Topical session	Field trip/cultural experience	Closing + next steps
17-17:30	Reflection	Reflection	Reflection		Departures
19:00	Opening reception/dinner			Closing reception/dinner	

Source: AAAS-TWAS, internal paper "Organizing a Science Diplomacy Course: Guidelines for Local Partners and Host Organisations"

The topical sessions that you find mentioned in the table can be filled with different content, we provided you in Part 1 of this toolkit.

We have experienced that a Master of Ceremony (MC), who leads participants through the course is an added value as well. She or he would be responsible for providing an initial overview of the course, introducing sessions, speakers and moderators, making announcements, contextualizing each session to the broader course goals, keeping the flow of the course, and keeping speakers and sessions on time. Ideally, this person has already been involved in SD activities and she or he can introduce the different topics and get into thematical discussions, if needed.

If you work with external speakers and moderators, we suggest briefing them in advance about the overall objectives of the course and the specific goals for their sessions to ensure they stay on message (see Part 2). It is important to reinforce in advance and during the course (if necessary) that all sessions and speakers focus on SD and not on related but distinct topics such as international science cooperation, science policy or science communication.

How do you proceed to selecting top participants?

Step 1: Launching a call

In-person training courses will be limited by the number of participants depending on space, budget, number of facilitators, and other considerations. Our experience suggests not exceeding 40 participants. We recommend that you launch a call for applications for the selection of suitable candidates. In order to successfully implement this step, we suggest doing the following:

- ✓ **Launch early** and publish the call at least six months in advance (ideally more).
- ✓ **Be clear** regarding target audience (geographic, disciplinary, age, career stage etc.; see Table 6: Target Group), criteria for admission, and documents to submit (this is to avoid a large number of non-eligible applicants) in the call text.[11]
- ✓ **Use technical assistance**. Some online platforms allow automatically importing applicant data into a dedicated database. The database will be useful for circulating applications to reviewers, keeping track of participants' details/requirements (e.g. preferred travel dates, funding arrangements, dietary requirements etc), drawing up documents such as the list of participants and for reporting purposes after the event.
- ✓ **Act in accordance with data protection** and privacy policy regulations.
- ✓ **Create guidelines and priorities** for the selection process (see step 5, page 32) in line with the call's objectives at an early stage (Chart 1: Outputs and Outcomes of SD Training Courses, page 16, might be helpful while conceptualising your selection criteria. The guiding question could be "With whom could you achieve the outputs and outcomes of your SD training course?").

[11] See TWAS and AAAS call for applications for a course on science diplomacy (link); Call for applications for the S4D4C science diplomacy workshop in Vienna (link)

Step 2: Communication
While the call is open, there are other activities to be done:

- ✓ **Dissemination** of the call via relevant networks (email newsletters/lists, social media, targeted dissemination to key organisations). To reach a broad SD community you could use our LinkedIn Group (link) and add our Twitter account @S4D4C.
- ✓ **Engagement of the advisory group** (see "Which roles and responsibilities are helpful?", page 28) to identify agenda topics and speakers.
- ✓ **Identification of review committee members** (see above). We advise contacting them as early as possible. It is desirable to have enough members so that no one person gets more than 20 applications to review.

Step 3: Eligibility Check
After the call for applications closes, the planning group (see "Which roles and responsibilities are helpful?", page 28) would conduct an eligibility check of applications and only advance those that meet the eligibility criteria (e.g. age, background, full application documents etc.) to the review committee/external reviewers.

Step 4: Review process
After the call closes, applications should be shared with reviewers (via an online system, or by other means, e.g. cloud servers).

- ✓ Depending on the number of applications and reviewers a period of **2-4 weeks** for the review is recommended.
- ✓ Provide clear **guidelines on the criteria** for reviewing and grading to the review committee. Our experiences have shown that it is important to consider the educational background, work experience as well as the motivation of career development in the SD field. But please bear in mind that the selection criteria are strongly related to the objectives of your SD training course. If adequate, you could use the following selection criteria:
- ✓ From our experiences the application numbers typically range between 200-300, so each reviewer should be limited to giving "A" grades to up to 20% of their applicants, if more or less 40 applicants should be selected at the end.

Table 14: Sample Score Sheet Including Evaluation Criteria

1. Educational background	Does the applicant have the necessary expertise based on their field of study or research? (up to 5 points)
2. Work experience	Does the applicant have experience engaging at the intersection of science and international affairs? (up to 8 points)
3. Motivation	Will participating in the course help advance the applicant's SD career? Does the applicant articulate plans and resources to incorporate the learning back into their organisation, country or sectors? (up to 10 points)
4. Publications and products	Consider both academic and non-academic outputs (e.g. reports, policy writing, blog posts, multimedia projects) relevant to SD (up to 5 points)
5. Letters of recommendation	Consider only letters that speak to the applicant's suitability for the course (up to 5 points)
6. (if adequate) Science & Technology Lagging Countries (STLCs) and Least Developed Countries (LDC)[12]	1 point
7. Woman applicant	1 point
8. Total score	Max 35 points
Grade	A= Top candidate (Over 25 points); B= OK candidate (Between 15-25 points); C= Not recommended (Below 15 points)

Source: AAAS-TWAS, internal paper "Organizing a Science Diplomacy Course: Guidelines for Local Partners and Host Organizations"

[12] List of the 66 Science & Technology Lagging Countries (STLCs) and – within this group - the 47 Least Developed Countries (LDCs). Countries with the asterisk are both STLC and LDC: Afghanistan*, Angola*, Bangladesh*, Benin*, Bhutan*, Bolivia, Burkina Faso*, Burundi*, Cambodia*, Cameroon, Central African Republic*, Chad*, Comoros*, Congo, Côte d'Ivoire, Democratic Republic of Congo*, Djibouti*, El Salvador, Eritrea*, Ethiopia*, Equatorial Guinea, Gambia*, Ghana, Guatemala, Guinea*, Guinea-Bissau*, Haiti*, Honduras, Kenya, Kiribati*, Lao People's Dem. Rep.*, Lesotho*, Liberia*, Madagascar*, Malawi*, Mali*, Mauritania*, Mongolia, Mozambique*, Myanmar*, Nepal*, Nicaragua, Niger*, Palestine (West Bank and Gaza Strip), Paraguay, Rwanda*, Sao Tome and Principe*, Senegal*, Sierra Leone*, Solomon Islands*, Somalia*, South Sudan*, Sri Lanka, Sudan*, Swaziland, Syria, Tajikistan, Tanzania*, Timor Leste*, Togo*, Tuvalu*, Uganda*, Vanuatu*, Yemen*, Zambia*, and Zimbabwe.

✓ From our experiences the **application numbers** typically range between 200-300, so each reviewer should be limited to giving "A" grades to up to 20% of their applicants, if approximately 40 applicants should be selected at the end.

Table 15: S4D4C Division of Participants

Scientists: Typically, 80-90% of applicants to a science diplomacy course (at least in the majority of our training courses) fall within this category. Top candidates are already involved or interested in policy and diplomacy. They can articulate in concrete terms their previous experience and/or understanding of SD beyond international science cooperation, why their participation in the course will help them advance their careers, and how they are going to incorporate the learning back into their organisations, countries or sectors. Listing international research collaborations, international scientific conferences, workshops, membership in international scientific networks alone does not warrant top marks.
Policy/diplomacy professionals: Our experiences have shown that diplomats and foreign affairs professionals do not apply to the courses in large numbers. Sometimes just being a diplomat interested in the workshop is enough "merit" even if they might not have previous experience or exposure to science diplomacy. In these cases, look for "potential" (e.g., country, position within the government, potential impact, etc.) to ensure that diplomats are a part of and benefit from the experience.
Others: These are often applicants from other sectors (NGOs, industry or sectors working at the science-diplomacy nexus) or applicants who are strategically important for the organisers. They provide valuable perspectives that enrich the course beyond the more traditional profiles in science or foreign affairs and should be evaluated according to the goals and themes of the course.

Source: AAAS-TWAS, internal paper "Organizing a Science Diplomacy Course: Guidelines for Local Partners and Host Organisations"

Step 5: Participants selection - what makes a top candidate?
Following the review process, the final list of accepted applicants and reserves has to be created. You would want to ensure you consider geographical, gender, disciplinary, sector, and other aspects according to your guidelines (see suggestion above).

Top candidates are involved or interested in policy and diplomacy beyond international science cooperation. They can articulate in concrete terms their previous experiences and/or understanding of SD, why their participation in the course will help them advance their careers, and how are they going to incorporate the learning back into their organisations, countries or sectors. Listing international research collaborations, international conferences, workshops, and membership in international scientific networks alone does not warrant top marks[13].

Step 6: Acceptance letters to participants
We advise you to clearly indicate what is offered (e.g., accommodation, travel etc.) and set a deadline for accepting the spot (ideally 7-10 days). Tailor the letter to the type of participants: self-funded, fully sponsored by organisers, partial support (whether accommodation or travel is provided), etc.

Which training material should be considered?

We recommend considering two different kinds of customised materials: Material for speakers and facilitators and material for participants.

1. **For speakers and facilitators**: Approximately 4-2 weeks before the course, all speakers and facilitators should receive detailed instructions to be able to prepare for their participation. A speaker's briefer could include the following requests and guidelines:

✓ Overall goals for the SD training course in general and specific goals for their session in particular. If necessary, a meeting could be organised (e.g. by the Planning Committee) to clarify the goals and learning objectives for each session.

[13] AAAS-TWAS, internal paper "Organizing a Science Diplomacy Course: Guidelines for Local Partners and Host Organizations"

- ✓ A draft agenda for review and confirmation of name, title, and affiliation, as well as the title(s) chosen for their session(s).
- ✓ Request for a speaker biosketch.
- ✓ Request to stay "on message" about SD and avoid conflation with related topics such as international science cooperation, science policy, science communication, etc. which can be part of, but not equivalent to SD.
- ✓ Speakers will sometimes be invited because they are working on an SD issue but not label it as such. If the term is unfamiliar, suggest viewing the online course "Science Diplomacy: An Introduction", developed by the AAAS Center for Science Diplomacy[14] or the S4D4C Online Course[15].
- ✓ Encourage speakers to participate in all sessions during their time at the course to enrich the experience of the participants, understand how their presentation connects with the others, and help establish long-lasting networks and mentoring relationships between speakers, participants and organisers.

2. **For participants**: Approximately 4-2 weeks before the course, participants should receive a package of general reading/viewing materials from the organisers and any session-specific readings assigned by speakers and facilitators. This information can be circulated together with the logistics note. The online sources mentioned above could be included as background material as well. You could also invite the participants to share a picture and short bio so that a booklet for participants can be prepared and offered upon arrival. It can be used to take notes, but also to write down people's contacts etc.

Which logistical arrangements do you need?

As with any other event, there are plenty of travel and logistical arrangements to be considered in advance, none of them specific to an SD activity. Still, we recommend circulating a detailed logistics note to all participants and speakers at least 2 weeks in advance. Relevant logistical issues broached beforehand may include meal arrangements, travel, transport, accommodation and visa letters.

The best way to reach your participants directly after arrival is to place some materials/registration instructions in the hotel room or at the reception, such as a welcome letter, the agenda, participants' booklet and the like.

Phase III: Evaluation

How do you gather feedback from your audience?

Getting feedback on your training course is quite important in case you want to make it even better next time. Our experience shows that a mix of different tools is helpful to get a good picture:

- ✓ **Daily debrief sessions at the end of each day:** This would allow you to better cover the needs of your audience. If necessary, you could even change (at least slightly) the thematic focus of the upcoming days, to extend the time schedule for most required topics and sessions or to prepare the use of further interactive instruments (e.g. small working groups for deepening networking instead of presentations).
- ✓ **Final debrief and evaluation session for participants:** The aim is to reflect in plenary or in groups about what worked and what did not, whether the learning outcomes were met, and areas for improvement. Possible questions might be:
  - › How would you assess that your understanding of SD has improved after participating in this course?
  - › To what extent has your understanding of the work of SD stakeholders improved?
  - › To what extent has your understanding of decision-making processes and SD regional/national or thematical approaches improved?
  - › Did you identify potential areas for future EU science diplomacy activities?
  - › Do you feel you have increased your own awareness/competency/mastery of SD-related skills?
  - › Did you learn about career opportunities in science diplomacy?
  - › How useful was the course in networking and establishing contacts with other participants?
  - › Have your expectations regarding the training course been met?
- ✓ **Paper vs. online evaluations:** Paper evaluations ensure a 100% response rate if made mandatory, e.g. before receiving a training certificate. But there is also value in allowing a few days for reflection and sending an online evaluation form (although it is likely to not get feedback from all participants).

[14] Science Diplomacy: An Introduction (link)
[15] S4D4C Online Course (link)

Part 4: Online Courses

There are different formats and settings that could be suitable for an online training course on SD. In this section, we focus on SD online courses for asynchronous learning, where the student has the chance to learn at their own speed (like MOOCs).

Phase I: Planning and Organising

How long does the planning cycle take?

On the one hand, online training courses offer the possibility to involve participants from different regions without the need to travel and being too time-consuming. On the other hand, online training courses should be carefully prepared offering interaction with the participants and avoiding the risk of students not finishing the training course. Therefore, the preparation of an online training course includes several steps: The implementation is time-consuming and, depending on your framework conditions and the options you choose, it might take at least one year. In the table below, we have described the general phases until launching the online training course. Please bear in mind that further interactive events and building an SD community within the online training course are recommended steps after launching the online course, but these are not presented here.

Table 16: Online Course Planning Cycle

Timeline (months before launch)	Resources needed	Tasks for organisers	How to prepare and who to consult?
12 months	20 working days	**Preparation of concept note** • What are your objectives? • What is your target group? • What budget is available? • What content would you offer?	• Prepare a strategic document, which should be adjusted in the different implementation phases • Involve SD experts • Gain feedback from potential trainees
11 Months	5 working days (if possible, in parallel with the preparation of the concept note)	**Choosing a technical solution:** • Collection of online training tools • Exchange with IT experts • Comparison of functionalities and costs	• Consult with experienced online training designers • If budget is sufficient, authorise external provider

Timeline (months before launch)	Resources needed	Tasks for organisers	How to prepare and who to consult?
10 months	20-60 working days (depending on the number of modules, lessons, topics)	**Preparation of online training content:** • Structure: modules, lessons, topics • Content: text, recommendations, quizzes, references	• Gain experiences from available online training courses • Exchange with experts
6 months	20-40 working days (in parallel with the preparation of the content)	**Preparation of training materials:** • Videos • Charts and infographics • Innovative materials such as comics, cartoons or the like	• Identify SD experts and arrange interviews • Identify content to be visualised • Collect and assign external providers, if needed
	40 working days (at least, please consider this phase as very time consuming)	**Technical implementation:** • Transfer of the content • Test of functionalities • Possible adjustment of navigation and structure	• Organise technical support and training on functionalities
4 months	20 working days (depending on the number of reviewers)	**Pre-testing:** • Feedback on content • Feedback on navigation • Final adjustments	• Formulate tests and questionnaires for pre-testing for quality assurance by external experts and possible trainees • Conduct technical implementation
1 month	10 working days	**Launch/Communication concept:** • Announcements in social media • Presentation in online and offline events • Personal interaction with crucial stakeholders	• Get support via networks, facilitators, partners, clients (different communication channels depending on the target groups)

Source: Authors' compilation/S4D4C

Phase II: Design, Development and Delivery

How do you design the programme?

In order to prepare the training curriculum for an online course, it is important to understand the needs of the target groups of current and future science diplomats. For this, we recommend the following activities:

- ✓ Run a **baseline survey and needs assessment** in relation to the goals, practices, challenges and needs of your target groups and their existing understanding of the topic. Previous experiences show that there are challenges related to resources, of getting one's message across, of raising the profile of S&T policy in general, of getting access to SD stakeholders, etc. Therefore, soft-skills, such as negotiation, communication and networking, are most in demand[16].
- ✓ Exchange with **potential trainees**, e.g. by interacting with them at other events and training courses.
- ✓ Collect information on already **available training courses** and synthesise existing state-of-the-art literature pertaining to academic and practice discourses, e.g. the S4D4C State-of-the-art report[17].
  See for example:
  - › AAAS online course on Science Diplomacy (link)
  - › MOOC on Global Diplomacy (link)
  - › S4D4C Online Course (link)

Depending on the target group you aim to reach, consider including the following aspects in your training content (see Part 1):

- ✓ What is SD? (especially for beginners and scientists)
- ✓ Who are the SD stakeholders? (especially for beginners, scientists and diplomats)

[16] S4D4C Study "What it takes to do science diplomacy. Baseline analysis and needs assessment" (link)
[17] https://www.s4d4c.eu/wp-content/uploads/2018/08/S4D4C_State-of-the-Art_Report_DZHW.pdf.

- ✓ What thematic and regional approaches of SD exist? (beginners and advanced experts, scientists and diplomats)
- ✓ What set of skills do I need to be a good science diplomat? (especially for beginners and scientists)
- ✓ What are good thematic examples where science diplomacy has proven to be successful? (beginners and advanced experts, scientists and diplomats)

What software requirements are especially needed?

It has been our experience that for all online learning packages, flexibility and independence in making choices as well as the possibility to self-direct is key for the trainees. Also, different learning tools and a mix of materials helps to make the course attractive. (e.g. including papers as pre-teaching, presentations, video, infographics and quizzes).

When you chose the software for your online course, it is worth considering the following functionalities:

Table 17: Software Requirements

Functionality	Implementation
Registration requirements	Low level registration requirements (name and password) are recommended to facilitate the start. A few biographical questions might however help to understand the target group, but they should be optional.
Structure	The majority of online training tools has the possibility to divide the content into different modules. While preparing the modules you need different content levels, for instance lessons (e.g. 1. SD Definition), topics (e.g. 1.1 Conceptualisation of SD; 1.2 Strategic Purposes Approach etc., see Part 1, Table 1), questions (e.g. Which dimensions of SD did the Royal Society & AAAS define in 2010?).
Navigation	The trainee should be aware where she/he stands, how to navigate further or come back. If possible, navigation symbols and hints should be visualised in different places throughout the page.
Progression	The completion of each module should be shown on screen so that users know where they stand in their progression. If applicable, it should be clearly communicated that only after finalising all modules can a certificate be issued.
Evaluation survey	We recommend embedding an evaluation survey before issuing the certificate, if applicable. This could help for further improvement and adjustment of the course content.
Certificate of completion	Providing the trainee with a certificate at the end of the course is a valuable asset. There are different options, either offering a certificate of completion once the evaluation survey and all modules have been marked complete. Alternatively, there could be a specific assignment at the end, that could be e.g. a multiple-choice test, a written essay reflecting on a selected question or even a team exercise with other trainees, if an online SD community for the course or a platform is available. Those however would need a follow-up by the organisers.

Source: Authors' compilation/S4D4C

How do you make the online training course user-friendly?

When you are preparing the online course please keep in mind that you have to "entertain" your trainees in order to motivate them to progress to the next module, lesson or quiz. There are several general rules which we recommend paying attention to:

1. **Keep the content short**: In an online training programme, the "educational module" is a unit similar to a "course hour" for in-person classes. For an online training course, we recommend that the programme consist of max. 10 course modules. All sessions and lessons should be ideally seen on the screen without scrolling down several times.
2. **Divide essential knowledge into multiple chapters that each correspond to a dedicated module**: We suggest establishing several "levels" with the aim of offering short and well-structured topics, e.g.
   - Level 1: Modules including the main topics (see Part 1: SD Definitions, SD Stakeholders, SD Approaches or Skills)
   - Level 2: Lessons including subtopics with videos, infographics, charts, references (see suggested subtopics e.g. in Table 3 "SD Approaches": National Approaches, Regional Approaches, Thematic Approaches)
   - Level 3: Topics including detailed information, examples, interviews (e.g. China: SD in the "One Belt, One Road" initiative)
   - Level 4: Quizzes related to the whole session (e.g. Has China established an implicit SD approach with the "One Belt, One Road" initiative?)
3. **Gather materials in various formats for each module** (presentations, videos, text documents, as well as further (audio)visual elements like pictures, figures[18], graphs, charts, icons, audio and video recordings[19] etc.). Offering training materials in different formats is advisable[20]. In particular, case studies[21] and video materials are interesting for trainees. As to the material mix, our experience has shown the balance between text and videos was generally appreciated.

[18] See also the S4D4C figures in our S4D4C Training Materials (link)
[19] See also our S4D4C video: What is SD for addressing global challenges? (link)
[20] See also Part II, Phase II: What training material should be considered?
[21] See also S4D4C Case Studies (link)

What materials could be used?

As mentioned in Part 2 "What methods work best?" we recommend that you consider a combination of different materials to cover all possible training methods. We have suggested four categories: "Transfer", "Exchange", "Application" and "Consolidation" (see page 25) Table 18 describes some examples of teaching materials relevant for online courses and shows how they can be assigned to the different categories.

Table 18: Teaching Materials for SD Online Courses

Method	Description	Knowledge			
		Transfer	Exchange	Application	Consolidation
Video lecture	Video lectures are becoming more and more popular. The main advantage is to give students a means to review interesting sections. You could use video lectures especially for offering basic SD knowledge, e.g. What is SD?	✓			✓
Interviews	The involvement of experts provides practical insights into the topics. "Science diplomats" (see Part 1: 2. SD Stakeholders) can explain the best policy strategies and decision-making processes.	✓	✓ (if contact details are available)		✓
Bibliography for further reading	At the end of each module, sources for further reading can be listed to give trainees the opportunity to deepen their understanding of a topic of special interest. The S4D4C Commented Bibliography offers a comprehensive set of SD papers (link).	✓			✓
Brainstorming questions	Brainstorming questions are another option to encourage reflection at the beginning or the end of each lesson or topic. The aim is to give the trainees time to form their own views and opinions and if possible, to discuss with authors additionally. Brainstorming questions should help to understand that in the SD context, there is no "one size fits all" solution. Also asking the trainee to reflect about his/her personal definition of SD can be a useful way to get started.			✓	✓
Quiz	Online quizzes can be a tool to make sure the student understood key concepts, SD actors, flagship initiatives, the role of science diplomats, the reason behind SD activities etc., all of that in a concise form.			✓	✓

Source: Authors' compilation/S4D4C

How do you disseminate and communicate a new online course?

The way we communicate largely depends on the target group of the course. Are we aiming at reaching out to as many people as possible? The more the merrier? Or is the course designed for a very specific audience, where we might need to conduct further research to identify key contacts and multipliers to reach out to? Depending on the characteristics of the online course or training, one could imagine for instance that online training courses could aim at illuminating a special aspect of SD, engaging more policy makers or diplomats in the discussions etc.

Depending on the size of the online course, a communication plan is useful, and the following guiding questions might be helpful:

Pre-Training:
- ✓ Which objectives are guiding the overall communication activities (e.g. reaching an SD community, networking between scientists and diplomats, awareness of the importance of SD)?
- ✓ Which communication channels can be used (e.g. multipliers – see Part 1: 2. SD Stakeholders, social media)?

During Training:
- ✓ How can we encourage interaction (e.g. implementing LinkedIn group, internal chat channel for trainees)?

Post-Training:
- ✓ Is there any follow-up activity that we want trainees to get involved in (e.g. invitations to relevant SD conferences)?

Your communication plan can include several action points, e.g.:
- ✓ Publishing information on institutional websites (of your organisation, partner organisations and multipliers).
- ✓ Publishing information on websites of SD networks (e.g. www.science-diplomacy.eu).
- ✓ Promoting the online course on Twitter using the #sciencediplomacy hashtag, LinkedIn (via the group on science diplomacy for instance), blogs, newsletters. This needs to be carefully tailored to the target group.
- ✓ Preparing introductory and interactive online workshops.
- ✓ Spreading information at live events.
- ✓ Using mass mailing.
- ✓ Taking advantage of individual contacts and mailing directly to key stakeholders.

How to interact with the trainees online?

Interaction with trainees is important, in particular, to keep students actively involved and to support sharing ideas and networking. A virtual platform for exchange that I linked to the course can also be used for trainees to upload exercises that might be needed to obtain the certificate. However, this part might be time-consuming, as prompt feedback to requests and support service is needed.

If trainees are invited to use a specific hashtag on social media (e.g. #ScienceDiplomacy; #SciDipProfessionals; #ScienceDiplomacyTraining), the community can be better linked, and interactions can be facilitated.

Phase III: Quality Assurance and Evaluation

What peer review steps should be considered?

Testing and reviewing a newly created online course for reasons of quality assurance is very important before you go online. Ideally, it is conducted from different perspectives, bringing internal and external feedback.

You can run two kinds of peer reviews:
- ✓ **Internal peer review**: Internal partners, experts and colleagues involved in SD have the necessary background to check the content and language, the exercises and the training materials. **PEERS need to be diplomats**, scientists and also science diplomats. Main questions for feedback could be for example:
  - › Have we properly covered the most important topics in the SD field? (Definition, Stakeholders, Approaches and Skills)
  - › Have you missed important sources, definitions, views and explanations?
  - › Have we offered enough SD case studies? Would you add/delete examples?
  - › Have we formulated challenging questions in our quizzes and reflection sessions?
- ✓ **External peer review**: External reviewers, e.g. trainees from previous training activities, can provide feedback on the structure, usability and intelligibility as well as different functionalities of the online course.

✓ **Continuous feedback**: The trainees who are taking the course are very aware of any flaws and can be invited to share their feedback on typos, failed links, navigation errors or other suggestions (see next sub-chapter). Also, SD topics of interest (e.g. as a prominent example the role of COVID-19 in SD settings) can be collected and adapted for the course.

In case the SD course includes topics that go beyond the topic of „addressing global challenges" and might be „diplomatically sensitive", additional reviews might be needed. This could be the case e.g. if the course touches upon the interface of influence based on national interest, security issues, science for peace, SD in conflict zones.

How do you gather feedback and and improve the online training course?

Evaluation is important for the organisers, on the one hand, to formulate lessons learnt and on the other hand, to get an impression of the target group that joined the online training course. However, the format also largely depends on the scope of the online activity. It should ideally be as short as possible, to encourage all trainees to take part, but also include the option for writing comments. The survey should not take more than 10 minutes.

Tables 19: Evaluation Methods

Method	Description	Outcome and possible Follow-up
Evaluation survey	An evaluation survey (see also Table 17) might be a (voluntary) part of the online platform. We recommend two sections: • Section A: Demographics (1/3 of the survey) • Section B: Questions regarding the course (2/3 of the survey): Closed questions can help to find out how respondents perceive different modules of the course, identify if learners were new to the topic and if they were confident about applying their newly acquired knowledge in their professional context. Open questions give space for individual comments on what learners where satisfied with, what could be improved and what was missing.	The outcome will show you who is interested in your SD course, e.g. in terms of country of origin, background, age (Section A). Depending on the results, you might consider a new dissemination strategy for your SD training course. After a certain period of time and number of participants, a systematic analysis of the feedback given through the survey is recommended. This way, the course format and content can be adjusted.
Polls	Polls with boxes to tick showing directly the results of all answers in a chart could be a simple and fast option to gather feedback.	This kind of feedback is very interactive but time-consuming to implement: you need an expert from your team who continuously follows the reactions and replies to the trainees' needs. Due to limited resources S4D4C doesn´t use this option.
Social media	Social media is another source for collecting feedback for an impact assessment exercise.	If trainees are encouraged to use a specific hashtag, analysing tweets about the online training course can be done easily.
Direct mailing/ personal feedback	Individual feedback can be collected systematically and contributes to the impact assessment.	Concrete follow-up activities can be planned if needed.

Source: Authors' compilation/S4D4C

Part 5: Online Workshops

Online workshops offer a great opportunity for interaction and for synchronous online learning, and, depending on how they are structured, can cover all four aspects of knowledge: transfer, exchange, application and consolidation (see also Table 18). A key advantage of online workshops is the fact that the organiser can be flexible in linking the theme to topics that are new or part of an ongoing public debate. They could either be stand-alone activities or organised as a series[22] and cover one or several topics (see Part 1).

Phase I: Planning and Organizing

Table 20: Online Workshop Planning Cycle

Timeline (months before launch)	Resources needed	Tasks for organisers
2 months (if you are not experienced in the preparation of online workshops, please extend the suggested time)	3 working days	**Preparation of internal concept note:** • Should it be a single event or a series? • What are your objectives? • What is your target group? • What budget is available? • On which SD aspect should the workshop focus?
2 months (at least)	2 working days	**Technical set-up:** • Chose a technical provider depending on the interactive elements you plan. • Prepare links to register and enter the meeting. • Define netiquette for smooth functioning. • Organise technical support for participants if needed.
1 month (at least)	5 working days	**Preparation of workshop agenda and content:** • Which experts could be invited for a keynote or panel discussion? • Which tools can be used to facilitate interactions? • Are there any visuals that you want to show? • Is a presentation needed? • Define roles (moderator, rapporteur of breakout sessions i.a., chat moderator, note-taker etc.)

[22] S4D4C Webinar Series (link)

Timeline (months before launch)	Resources needed	Tasks for organisers
0.5 month (at least)	2 working days	**Communication:** • Announcements via different communication channels. • Registration, invitations.

Source: Authors' compilation/S4D4C

Phase II: Design, Development and Delivery

How do you set objectives for an online workshop on science diplomacy?

Online workshops offer a platform for exchange on SD topics between trainees and SD experts. Suggested overarching objectives are

- ✓ to intensify the dialogue among different stakeholders and build an SD community,
- ✓ to implement tools for sustainable communication and exchange via social media,
- ✓ to exchange different views and discuss relevant, current topics (e.g. critical views on SD, EU SD in the crisis – the COVID-19 experiences, better coordination of national, regional and international approaches, SD contribution to solving global challenges etc.);
- ✓ to continuously improve the content of further SD training (e.g. SD online courses – see Part 4) based on lessons learnt from trainees and experts.

Depending on the objectives you set, especially if your focus is on facilitating an exchange among the trainees, we would advise limiting the number of participants (<150 trainees). If building an SD community is your main target, the participants should be encouraged to not be anonymous.

You should decide if you want to record the discussion. Recorded content can be used in further training activities – off- and online. You have to make this explicit in order to work in line with data privacy standards. If you aim at having an open discussion and freely exchanging different views and opinions (especially critics on current SD approaches), it might give more freedom to the participants to not record the workshop.

How do you combine online workshops and self-learning courses on science diplomacy?

If you have developed an online course for asynchronous learning (like MOOCs), online workshops might also serve as a tool to provide a general overview of the online training course to potential students. Within approx. 1.5 hours, the training content authors can introduce the academic goals of the online course and the different content of the modules. For a large number of participants, you have to consider interactive formats which suit a broad audience, e.g. virtual quizzes and surveys (depending on the virtual platform you use). The concept of "flipped classrooms" could be a guiding principle for teaching in this context, as students would study the online course content on their own at home, and then move to a virtual classroom provided by the workshop where active learning would take place guided by the SD trainer, putting the focus on the exchange between students and course authors as well as SD experts.

Online workshops can be organised aiming at the following objectives:

1. Presenting the content of an online course – introductory workshops,
2. Deepening the knowledge of the online training course – for registered trainees,
3. Interaction with authors and experts on selected topics,
4. Exchange on case studies, SD experiences and approaches among trainees,
5. Repetition and reflection of the online training content,
6. Feedback from trainees.

Phase III: Evaluation

Ideally, also online workshops are improved continuously and feedback from participants and speakers is gathered systematically. This feedback can relate to the technical implementation as well as to the content and discussions. If a series of online workshops is organised, there might be a short online survey as a follow-up activity, to monitor the impact and to plan further.

Conclusion: Let's move from theory to practice ...

Dear Science Diplomacy trainers,

"An important role for science diplomacy is to build bridges between science, technology and innovation practices, national interests, as well as global challenges." says Mariya Gabriel, Commissioner for Innovation, Research, Culture, Education and Youth of the European Commission (link).

As the demand for building capacities at the science-diplomacy interface grows around the world, we hope this toolkit will help you plan, design, implement and evaluate a successful training program that you can adapt to your context and needs. It introduces a wide range of format and content options you can tailor your objectives and audience.

We appreciate if you drop us a line and let us know how you use this toolkit:
contact@s4d4c.eu.

On behalf of the S4D4C consortium, we thank you for contributing to training the next generation of science diplomats!

S4D4C

USING SCIENCE FOR/IN DIPLOMACY
FOR ADDRESSING GLOBAL CHALLENGES

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