Who does science communication not reach?

This cannot be determined on the basis of fixed groups. There are many factors that can lead to exclusion, which can also partially overlap and reinforce each other.

The exclusion factors identified in the **Science for All** project can be divided into 3 categories:

- **Individual factors**
- **Social factors**
- **Structural conditions**

However, this is not always clear-cut, factors can overlap and also reinforce each other.

(Further information on the back page)

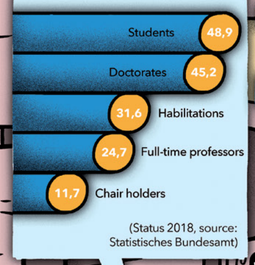
13 Language - in relation to foreign and technical languages

16 Time resources - available free time

21 Gender - especially considering social construction

The lack of role models (in several aspects) plays an important role for the accessibility of science communication - here with the example of gender:

Academic career in Germany / Share of women in %

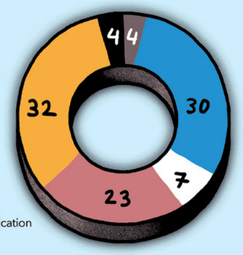


(Status 2018, source: Statistisches Bundesamt)

4 Degree of (formal) **education**

General school education of the population aged 15 and over in Germany

(Status 2017, source: German Federal Statistics Office)



- Still in school
- Completed primary school
- Completion of polytechnical secondary school
- Secondary school or equivalent
- Advanced technical college or university entrance qualification
- No general school leaving certificate

15 Values and issue-specific values

29 Lack of resources to implement specific communication formats for target groups not reached

8 Lack of information - about existing offers and access

12 Scientific literacy / basic scientific knowledge

30 Lack of services accompanying the established science communication formats (e.g. childcare)

26 Lack of access to the target group, especially with regard to the media and communication channels used

1 Lack of relevance of the research topics to everyday life and living environment

14 Trust in organisations and the scientific system

27 Complexity of science communication in terms of content or form

19 Lack of familiarity with science, especially with the academic habitus (behaviour, habits)

"Do you know a scientist personally" - Representative survey in Germany

(Source: Wissenschaftsbarometer 2018)

- Yes
- No
- I don't know, no idea

23 Regional affiliation - e.g. in rural areas or in marginalised urban districts

18 Ethnic origin / nationality

17 Individual impairment or social disability

22 Cultural barriers - both in relation to science per se and to institutions or communication behaviour

7 Disappointments and bad experiences with science communication

2 Age - both children / teenagers and seniors

10 Diseases - especially chronic

5 General **lack of interest** in science

24 Socio-economic status - as an overarching concept that combines various factors (e.g. education, income)

3 Fears – particularly social anxiety

31 Time planning, e.g. unfavourably scheduled dates

25 Disinterest and lack of appreciation by the provider - beyond the individual situation through lack of reflection and dealing with criticism

28 Location - particularly in terms of accessibility, reachability, atmosphere

9 Financial resources / income

- 18,7% of people in Germany are affected by poverty or social exclusion
- 19,5% of households in Germany have a monthly net income of less than € 1,300
- 1,12€ are provided monthly for education in the Hartz IV standard rate
- 60,9% is the at-risk-of-poverty rate of children from parents with low educational attainment in Germany (the EU average is 51.3%)

(Status 2018/2020; sources: German Federal Statistics Office, Statista, Regelbedarfsermittlung)

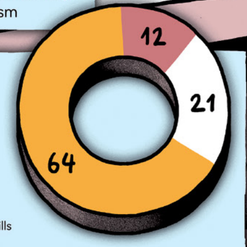
20 Low population density/size - hinders access to the target group

6 Limited mobility - physical or in terms of infrastructure

11 Reading and spelling skills

Illiteracy in Germany

(Status 2018; source: LEO 2018 – Leben mit geringer Literalität.)



- Poor literacy skills
- Poor writing skills
- Good literacy and writing skills

Source: Karlsruhe Institute of Technology & Wissenschat im Dialog / Markus Färber

Project partners:

KIT Karlsruher Institut für Technologie

wissenschaft im dialog

Supported by:

Robert Bosch Stiftung

Wissenschaft für alle

Does science have to be for everyone?

In times of increasing discussions about so-called fake news and openly articulated scepticism about science, it is more urgent than ever to enable everyone to participate in the discussion about science, the evaluation of new results, the design of framework conditions and the science system itself in an informed way. The handling of scientific information and uncertainties in the Corona pandemic has impressively shown how important evidence-based discourse is for society as a whole. This applies equally to a large number of other global problems, such as climate change, the security of modern societies or the transformation of energy systems. Inclusive opportunities for participation in and access to science are also the basis for personal decisions, for example on health issues or technology use, as well as for further education and career options.

It is true that there is a growing number of communication activities. Nevertheless, many organisations - whether in science communication, political communication or even further education - face the problem that they do not reach certain population groups or exclude them through the design of their offerings. This applies in different ways to all methods and media used - whether online or offline.

In order to fulfil their social responsibility, science organisations must critically reflect on their communication strategies and measures and make them more diverse and inclusive. Of course, „Science for All“ is a utopian ideal and, especially in view of the diversity of topics and diverse personal interests, not everyone needs to be interested in everything. Nevertheless, there is a multitude of explicit and implicit barriers and structural injustices that need to be addressed.

The “Science for All” project

From 2017 to 2020, the Karlsruhe Institute of Technology, Department of Science Communication, together with Wissenschaft im Dialog and funded by the Robert Bosch Stiftung, implemented the project „Science for All“ to systematically investigate which population groups have so far not or hardly been reached by science communication, why they are not reached and how this can be changed.

The heterogeneity confirmed in a literature review and the diversity of groups not reached to date make it difficult to define them clearly. In most cases, an interplay of various exclusion factors (intersectionality) or, causally, their lack of or insufficient consideration by science communication lead to exclusion. Therefore, in order to systematize the research results in the present typology, the focus was placed on these factors rather than on social groups. The assignment of the factors to three levels is intended to provide a systematized overview, but should by no means be seen as an attribution of a deficit or a debt. In all cases, the responsibility for designing inclusive services lies with the scientific organizations

For the further course of the project, three exemplary communities, which are often not reached by classical formats of science communication, were integrated more intensively: socially disadvantaged people in marginalised districts, vocational school students and Muslim youth with a migration background. Insights into their situation and needs were gained through interviews and focus groups. In a participatory approach, new formats or access paths for science communication were developed and tested together with representatives of the respective communities.

About this graphic

This hidden object graphic is aimed at stakeholders in science and science communication and is intended to stimulate understanding and reflection on all 31 exclusion factors identified in the project (factors marked with an * are overarching concepts of several other factors). The factors are assigned to the three categories formulated in the typology, but are freely distributed in the diagram. The visualizations show exemplary experiences of discrimination, diversity deficits and symbolic representations of structural problems. The image is supplemented by infographic elements that reflect selected statistical information.

The following is a shortened version of the more detailed explanations of all factors from the project's interim report.

Individual factors

At this level are the subjective or individual conditions that can influence the accessibility of science communication offerings.

1 Reference to everyday life

Connectivity to the everyday life and living environment of target groups is an important factor in the analysis and planning of science communication formats. A lack of thematic reference to everyday life can create the feeling of not belonging or not being addressed. The announcement or title of an event can already determine whether the reference to everyday life or the world in which we live is successful. Even so, relevance to everyday life can be created through the experience of self-efficacy, for example through active participation in a workshop, a Citizen Science project or a dialogue process. Communication channels or places close to everyday life can also help to reach the relevant target groups (→ *28 “Place”*). However, there are also some areas of science that can do without the relevance to everyday life because they inherently fascinate people (e.g. space research) – relevance to everyday life may not be absolutely necessary in all cases.

2 Age

The factor “Age” can refer to children and young people as well as to older people and senior citizens. Generally, this does not always affect entire age cohorts; there are numerous exceptions: pupils are often addressed as a specific target group, e.g. in the STEM funding programme. In contrast, senior citizens regularly attend museums or evening lectures. It is only when combined with other factors that not all age groups are reached (→ *4 “Education”, 6 “Limited mobility” or 24 “Socio-economic status”*). The age structure of a region or city must therefore be taken into account together with other socio-demographic conditions when planning science communication formats.

3 Fear

The “Fears” factor is a collective term. It includes concrete fears, such as the concern of socially discriminated persons that they will attract unwanted attention through their participation in projects or programmes and be exposed to negative consequences. At the same time, there are fundamental fears such as the fear of losing control or of expressing one's own opinion. In addition to these social fears, there is also the fear of visiting a laboratory or of larger groups of people during an event, for example, especially in science communication. In particular, there is also the fear of being exposed because someone is not familiar with scientific practices or has supposedly insufficient background knowledge. Addressing this requires a basic sensitivity in the planning and implementation of events (e.g. in moderation).

4 Education

Individual (formal) education is a central factor for accessibility through science communication. Interest in certain topics, e.g. politics or science, can depend strongly on the individual educational background. People affected feel as if they do not belong, do not feel addressed or do not understand the invitations. Some feel they lack competence or do not like to appear in public out of concern that they will not have a say (→ *3 “Fears”*). Often, previous knowledge is necessary to participate in certain formats. The lack of such prior knowledge can make it impossible to build on existing knowledge and promotes frustration or rejection - regardless of whether science communication is aimed at formal science education or informal education outside schools and other further education institutions. The term “Bildungsferne” (“educationally deprived classes”) is often measured primarily in terms of the highest educational level attained, even though the term itself is not defined more precisely and is sometimes problematic. Practical planning of science communication thus requires knowledge of the educational background of the relevant target group(s) and the family environment, which is a central aspect of “science capital”, as well as a reflection on the respective educational level. (→ *11 “Reading and spelling skills”, 12 “Scientific literacy”, 24 “Socioeconomic status”*).

5 Lack of interest

This factor describes a lack of interest in the subject as a whole, e.g. shaped by habits (→ *19 “Lack of familiarity with science”, 24 “Socio-economic status”*), or in the concrete content of an offer (→ *1 “Reference to everyday life”, 4 “Education”*). Although there may be a reference to everyday life, a topic may still be considered irrelevant due to attitudes. For example, school lessons that are perceived as boring can lead to a general disinterest in science. In addition to lack of interest in content, there may also be a pronounced individualism or a deliberately chosen unattainability due to a lack of openness to certain offers.

6 Limited mobility

The “Limited mobility” factor has several dimensions: mobility can be restricted, for example, by physical conditions such as illness, disability or age. In addition, place of residence in combination with low income (e.g. poorly developed public transport and no car of one's own) or age (e.g. no driving licence yet) can also have a negative influence on mobility. The choice of venue and timing of an event should therefore be adapted to the mobility behaviour of the relevant target group(s). Is it still possible to return home by public transport, e.g. at the end of an evening event? (→ *16 “Time resources”*) This factor is particularly important for research institutions or universities located in rural areas that want to hold events at their own premises.

7 Disappointments/bad experiences

This factor refers to previous contacts with communication and service offers of institutions. Disappointments are caused, for example, by broken promises, unfulfilled expectations or negative experiences with the format of an offer. The bad experiences do not necessarily have to have been made exclusively with a specific institution. Rather, experiences once made are often transferred to other similar institutions or are based on hearsay. Participants of an event may be disappointed with the implementation because they expected something else on the basis of the announcement - for example, if a dialogue was announced and then there is no opportunity to get involved. Further, negative experiences with science/technology per se (e.g. at school) or with an individual scientific field can also be part of this factor (e.g. a negative attitude towards geosciences due to mining in the region being experienced as a negative factor). It is therefore important in the planning and evaluation of one's own offers to take up recurring criticism or complaints and to adapt future offers accordingly.

8 Lack of information

Exclusion can also be caused by the “Lack of information” factor, for example when offers are announced via the wrong channels and, for example, flyers are displayed in places that are not visited by the relevant target group. Media usage behaviour or language barriers can also mean that information does not reach the relevant target groups. In addition, offers for previously unreached groups are often made only once and therefore there are no established information channels. Analysing which advertising measures other stakeholders (both similar organisations, e.g. from the cultural sector and purely commercial players) use to address the relevant target group(s) can therefore be helpful for communicating one's own offer. Even if information is placed in the right places, it is not always noticed (→ *5 “Disinterest”*). Regardless of the information channel chosen, clear and complete communication on the framework conditions and participation requirements of the offer is important.

9 Financial resources/income (poverty)

Low or not at all freely available financial resources due to unemployment or low-paid employment, for example, can have an impact on accessibility. Not only direct costs such as entrance fees have an exclusionary effect, but also indirect costs such as travel costs, additional on-site catering or the purchase of a device for using a digital service. Previous findings show that although this factor can be taken into account when planning offers, e.g. by offering discounts or choosing other venues that involve lower costs for participants (e.g. shorter travel distances), this alone is not enough. With regard to science communication, smaller museums or initiatives may not always be able to offer reduced entrance fees due to their low budgets.

10 Illness

In particular, long-term or chronic, psychological or even addictive illnesses lead to people not being reached. Especially in old age, diseases can have a strong exclusionary effect and further increase social inequality. In addition, illness can also lead to reduced mobility. Operators in science communication must therefore treat certain topics sensitively, especially in the area of health. Illnesses experienced by oneself or by relatives require special care in addressing and communicating with those affected.

11 Reading and spelling skills/Literacy

This factor is closely related to educational background (→ *4 “Education”*). People with reading and spelling difficulties or illiterate people can easily be excluded, as addressing or contacting them via text-based communication channels (digital or print) does not work in these cases. The feelings of shame often associated with a reading and spelling weakness or illiteracy can also have an exclusionary effect. Here, science communication must develop alternative formats to the classic, text-based form of presentation in order to reach these groups. In addition to conventional publications in journals and brochures, parallel offers could be made that allow different access to content, such as videos. The design of online presences could also be reconsidered. Certain content can be offered translated into simple language.

12 Scientific Literacy*

In the literature, this factor is not explicitly named as an exclusion factor in its own right, but is nevertheless listed here because of its relevance to the field of science communication. The term “scientific literacy” describes the competence to recognize scientific topics and questions and to apply and classify scientific knowledge. Formal educational attainment is not the focus here (→ *4 “Education”*). The promotion of “scientific literacy” is often a concrete goal of science communication offerings and also plays an important role in the evaluation of formats. When designing new offerings, it is therefore particularly important to consider what basic (scientific) knowledge is required or whether low-threshold access can be provided. (→ *5 “Lack of interest”, 18 “Ethnic origin”, 24 “Socioeconomic status”*).

13 Language

“Language” is one of the central exclusion factors in all areas. There may be language barriers for non-native speakers. Moreover, there can be barriers between everyday and technical language as well as through group-specific language use such as youth language. Depending on the language form, i.e. whether written or spoken, the factor can have different effects (→ *11 “Reading and spelling skills”*). In science communication, language must be taken into consideration especially in announcements, explanations and information materials. In addition, language barriers are increasingly being encountered in the design of new forms of communication offerings such as interactive museum exhibits or participation offerings. The literature often describes these innovative formats as complex in terms of content and, above all, language. In contrast, consumer-oriented offers such as films or texts enable at least partial communication of information, e.g. if these can be understood and received incompletely. When designing communication offers, it is advisable to analyse which languages the relevant target groups speak. Depending on the population structure, there may be particularly relevant second languages or existing German language skills may not be sufficient to take advantage of the services. For example, it may be useful to create multilingual offerings or to deliberately avoid an academic language style.

14 Trust

Two levels of the “Trust” factor are described in the literature: it can relate specifically to individual (science) organisations as well as to the science system itself. Concrete mistrust of a science institution (e.g. by a scandal associated with the institution) and diffuse general mistrust of public institutions or “science” per se can be transferred to concrete communication offerings. The reasons for the lack of trust can be understood both rationally and based on irrational views or fears (→ *3 “Fears”*). In addition, a lack of trust can also be based on specific topics, e.g. due to different positions in a social or political conflict.

15 Values

The “Values” factor can refer to concrete, topic-related values. Information about specific values on individual topics or on science as such can be found, for example, in the annual barometer of science by Wissenschaft im Dialog. This factor also includes specific value systems that may differ from those of science in the relevant groups, for example. Both value systems and topic-related values can be a hurdle for participation in dialogue or communication formats. An example of this is attitudes towards electricity generation by nuclear energy, as well as religion-based rejection of certain natural sciences or belief in conspiracy legends, such as on the subject of vaccination. When planning offers, it therefore makes sense to consider what values or attitudes the relevant group represents or whether the research topics to be communicated contain potentially controversial religious or cultural aspects.

16 Time resources

The “Time resources” factor refers to the freely available time of a person. Reasons for little available time can be childcare, caring for relatives or the need to work several jobs (→ *24 “Socioeconomic status”*). However, small entrepreneurs, shift workers, commuters, (young) families and single parents also have a limited time budget. How much spare time is spent on something is strongly related to the expected benefit, especially with regard to science communication (→ *1 “Reference to everyday life”, 5 “Lack of interest”*). In addition, there are numerous science communication formats that are very time-consuming because they aim at a more intensive exchange. An analysis of the target group's time resources can therefore be helpful when planning communication offerings. To ensure that participation does not fail due to the available time resources, the times at which the formats are offered and the duration of the offers should be taken into account.

Social factors

Social factors describe the interaction of individuals within and between different groups.

17 Disabilities/Impairment

This factor includes both physical and mental impairments. The background is the interaction of individual impairment and the disability caused by the social framework. For example, the exclusionary effect of the factor is caused by the lack of pedagogical concepts or qualified personnel. A central aspect is often the insufficient spatial resources of an event location. Due to political guidelines and legally binding regulations (e.g. in relation to barrier-free conversions), the inclusion of people with disabilities is becoming more and more important. At universities and research institutions, however, this usually affects students or employees. Museums are increasingly offering barrier-free services and more inclusive exhibition designs, for example by using simple language. For the design of more inclusive offers for people with disabilities, however, the accessibility of digital offers should also be examined and, for example, support offers for attending events such as sign language interpretation or easier access for accompanying persons should be given more attention.

18 Ethnic origin/Nationality

People with an ethnic origin other than that of the majority population are most often described as an excluded and racially discriminated group in the literature. This factor often occurs in combination with other factors (→ *4 “Education”, 13 “Language”, 24 “Socioeconomic status”*). People of a different origin who have not been reached may be recent immigrants or refugees for whom residence status or a residence obligation play a role. But this also includes groups of other ethnic origins who have lived in a country for several generations and form their own cultural communities there, but who have not been reached by previous communication services. A precise analysis of the ethnic groups on site is therefore helpful for the design of communication measures. The science system itself actually offers a good starting point for this, as it is internationally oriented and usually shows greater ethnic diversity compared to the overall population. Scientists with different ethnic backgrounds can, for example, serve an active role as lecturers, provide input for the design and planning of offers and act as multipliers - even though it must be taken into account that different socio-economic and educational backgrounds of the scientists can have a differentiating effect.

19 Lack of familiarity with science/Habitus/ Science capital*

This factor explicitly refers to science communication and other interactions with the science system. It includes familiarity with science in terms of location (e.g. being familiar with a campus or museum) and even more so with science as a system. It also includes the habitus of scientists, i.e. manners, idioms, habits and behaviour. Further, it includes a lack of familiarity with situations in science or science communication: How do I behave during a lecture? When and how may I ask questions? How do I address scientists? Those who do not know and master these implicit rules quickly feel excluded. It is therefore important to become aware of your own habits as a communicator, to reflect critically and to avoid them as far as possible. The overarching concept of “science capital” is also part of this factor. In addition to familiarity indicators (science-related media consumption, participation in extracurricular activities, knowledge about science in the family, personal relations to scientists and daily engagement with science topics), this also includes “scientific literacy” as well as science-related values and attitudes.

20 Low population density/size

If a target group is spread over a large geographical area or if the target group is very small, addressing it often involves a great deal of effort, as specific and individual offers are required. Low population density or size can affect both rural areas and scattered populations in larger urban areas. Spatially dispersed target groups pose a great challenge, especially for science communication projects of location-bound science institutions. (→ *6 “Limited mobility”, 23 “Regional affiliation”*).

21 Sex/Gender

Gender as a socially ascribed gender characteristic and role based on biological sex takes into account in this category the social dimension that results from it. The literature shows, for example, that unequal power relations between men and women mean that the latter are less likely to participate in continuing vocational training. Gender (and also sexual orientation, especially for the LGBTQ+ community) can therefore lead to discrimination and socio-economic disadvantage. In addition, cultural aspects can play a role in this factor, for example when unaccompanied participation of girls in science communication offerings is permitted by their parents only once a sufficient relationship of trust has been established (→ *22 “Cultural barriers”*). When designing communication offerings, care should therefore be taken to ensure, for example, a balanced gender distribution among those who communicate, as well as gender-neutral language in texts and the avoidance of (visual) stereotypes.

22 Cultural barriers

“Cultural barriers” can manifest themselves, for example, in the fact that communities remain within themselves. This is found in the literature for different areas. One example is the access of older migrants to existing offers of help, which is often impaired by language and social as well as cultural barriers. In addition, there may be a lack of intercultural competence on the part of communicators. In the education sector, cultural differences and their insufficient consideration can have an exclusionary effect if, for example, schools do not take cultural differences into account. The same applies to science communication offerings. For example, cultural barriers can lead to the fact that offers are perceived by groups as “not suitable for them”. Similarly, cultural imperialism, which is often found in science museums, can have an exclusionary effect if marginalised groups feel underrepresented or even excluded. (→ *15 “Values”*).

23 Regional affiliation (urban/rural)

Another exclusion factor is regional affiliation. In rural areas, for example, offers are often farther away and public transport is not sufficiently available. Similarly, in cities, economically and socially “disconnected” districts can also be excluded from science communication, for example, because there is no social infrastructure as an access point and the route to event locations in “foreign” districts can be a deterrent. Especially in science communication, offers are often carried out only where museums or universities are located. When planning offers, it is therefore advisable to analyse the settlement structure of the catchment area and to evaluate the regional origin of the audience at previous events. On this basis, for example, decentralised offers can be created or better transport connections can be ensured through the choice of the event location.

24 Socio-economic status*

“Socio-economic status” is the combination of economic and social status. It is usually measured by the indicators education, income and occupation or a combination of these. Sometimes, however, other indicators such as property ownership are also used. The less clearly defined concept of social status can also be subsumed under this factor. This refers to the position that a person occupies within a ranking of the social hierarchy. The position is determined by characteristics such as income, property or power. With regard to science communication offerings, this factor can have an exclusionary effect in that a low socio-economic status can lead to financial barriers (→ *9 “Financial Resources”*). It can also manifest itself in social and cultural barriers, for example, when communication offerings are perceived by a group as “not intended for them”. For the planning of offers it can therefore be helpful to evaluate data on the socio-economic status of the population in the catchment area or within the online reach of an organisation.

Structural conditions

The third group is exclusion factors at the structural level of the offers or suppliers. They are usually closely related to individual and social factors. For example, a lack of access to groups can lead to members of these groups not receiving any information about the offer.

25 Disinterest/lack of appreciation by the provider

This factor includes a lack of interest in involving new groups that have not been reached or have been poorly reached, as well as a lack of appreciation for these groups. In concrete terms, this is expressed, for example, in announcements and formulations regarding the goals, purpose and design of the offerings or the organization as a whole. Even more fundamentally, this factor includes, for example, ignoring cultural customs, needs and potential barriers. In the literature, a lack of motivation for the inclusion of people with disabilities by universities or companies is criticised just as much as the lack of low-threshold offers, e.g. in the area of political education. These problems are also described in relation to science communication offerings when a foreign group is assumed to be insufficiently familiar with science during a museum visit and the group is consequently perceived as an “unsuitable” audience, for example. In this case, appropriate training can be helpful to create familiarity with relevant target groups on the part of the provider and, based on this, to increase appreciation.

26 Lack of access to the target group

The choice of communication channel can significantly affect access to a particular target group, for example if the channels chosen do not correspond to the target group's media usage habits (→ *8 “Missing information”*). This factor is described in the literature as one of the central aspects in reaching target groups. A lack of access to stakeholders or multipliers through which the relevant target groups could be reached is another factor. Actors in science communication are also confronted with the question of how to reach groups that have not yet been reached. For example, if an event is announced only in local newspapers, certain people will not be reached due to their media usage behaviour. A precise analysis of the information channels and forms of communication used in the past to reach individual groups is therefore just as advisable as the involvement of stakeholders and multipliers who can share their knowledge about the (media use) behaviour of the target group and thus open up access routes.

27 Complexity

This factor describes both an inappropriate complexity of content as well as the offers and their structure. This includes the preparation of information, necessary explanations and didactic reductions. For example, documents are often long or written in complicated language, especially in science. In this context, the literature also points to excessive complexity at the level of society as a whole - for example in relation to politics - which can overwhelm people and therefore discourage participation. To reduce the complexity for a non-scientific audience, the existing prior knowledge of the target group(s) must be taken into account when designing science communication offerings. For example, parallel offers for different levels can avoid over- or understraining. (→ *1 “Reference to everyday life”, 4 “Education”*).

28 Place

This includes aspects such as the location, reachability, accessibility, barrier-free access and atmosphere of venues. Structural and technical accessibility can have a positive effect on reaching people with mobility and sensory impairments. The architecture of a museum, research centre or university can also have a deterrent effect - both in terms of external appearance and in terms of orientation inside the buildings. It is therefore recommended that offers for groups that have not yet been reached are made in everyday places from their living environment. For example, poor accessibility of a place by public transport canhave an excluding effect (→ *6 “Restricted mobility”*).

29 Resources for the implementation of specific offers

This factor includes financial, personnel and other resources to make (previous) communication services more inclusive (e.g. through sign language interpreting or content revisions). It also includes the lack of resources for a sustainable and longer-term offer to create a relationship with the target group and to establish the offer permanently. This factor can be addressed only to a limited extent by the providers themselves, as they too are often dependent on external funding and available budgets. Offers of science communication are subject to the same problems as other areas. For example, the use of sign language interpreters for all lectures without exception would certainly make them more inclusive, but at the same time would require significant additional financial resources. Accordingly, a needs assessment and flexible support through service offers is an important aspect of planning.

30 Service offers

This includes additional service offers as well as their usage costs and quality. For example, in order to be able to reach fathers or mothers with younger children, the establishment of free childcare is recommended as a possibility, as is a family-oriented organisation of the services with considerably more time flexibility than usual. Aspects such as a low-cost gastronomic offer and the option of bringing your own food can also help. Particularly when visiting museums, for example, the cost of food and drinks is often cited as an obstacle.

31 Time scheduling

The “Time scheduling” factor includes the arrangement of opening hours or event times as well as the scheduling and duration of events. The question of when an event takes place or can be attended can determine whether full-time employees or shift workers can participate at all. This also applies to science communication offerings. If an event takes place in the early Saturday afternoon, people who usually work on Saturdays (e.g. employees in retail trade) will not be able to participate.

Publications of the project:

Schrögel, P., Humm, C., Leßmöllmann, A., Kremer, B., Adler, J., & Weißkopf, M. (2018). Nicht erreichte Zielgruppen in der Wissenschaftskommunikation: Literatur-Review zu Exklusionsfaktoren und Analyse von Fallbeispielen. https://www.ssoar.info/ssoar/handle/document/66846 (in German)

Humm, C., Schrögel, P., & Leßmöllmann, A. (2020). Feeling left out: Underserved audiences in science communication. Media and Communication, 8(1), 164-176. http://dx.doi.org/10.17645/mac.v8i1.2480

Humm, C. & Schrögel, P. (2020). Science for All? Practical recommendations on reaching underserved audiences. Frontiers in Communication – Science and Environmental Communication. https://doi.org/10.3389/fcomm.2020.00042

Selected further literature:

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Betsch Cole, J., Lott, L. (2019). *Diversity, Equity, Accessibility, and Inclusion in Museums*. Rowman & Littlefield.

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