Expert Group "Communicating Sciences and Arts in Times of Digital Media"
of the Swiss Academies of Arts and Sciences

Draft Chapter

Journalists, Influencers or Platforms – Inter- mediaries of Science Communication in Switzerland

Excerpt from of the Upcoming Expert Group Report "*Science in Public: The State of Science Communication and Public Engagement with Science in Switzerland*", to be published in 2021

«Communicating Sciences and Arts in Times of Digital Media»: About the Expert Group

In Switzerland and beyond, science communication – encompassing not only STEM subjects, but also humanities and arts – has received more attention from academia, (science) politics and society in recent years. But the science communication landscape is changing, creating new challenges such as economic pressures on science journalism, a pluralization of science communication actors and formats, and the emergence and growth of digital media.

The expert group “Communicating Sciences and Arts in Times of Digital Media” has been set up by the Swiss Academies of Arts and Sciences. Its mandate is twofold: First, it assesses the status quo and current trends in science communication in Switzerland. Second, it will develop scenarios for improving science communication and public engagement with science.

The group consists of 16 experts from science communication research, information and computer sciences, disciplines with high public visibility such as climate and health sciences, as well as practitioners from science journalism and institutional science communication ([more information on the expert group](#)).

The Expert Group’s Status Quo Report

The first part of the expert group’s mandate is to assess the status quo & current trends in science communication and public engagement with science in Switzerland. This assessment will culminate in a status quo report which will be published open access by the Swiss Academies of Arts and Sciences.

Based on scholarship on Switzerland and beyond, the report will focus on the perceptions and attitudes of the Swiss populations towards science and their sources of information about science related issues. It also assesses the science-related communication by different stakeholders and the role of journalists, technology platforms and other intermediaries of science communication (see the table of content on the next page). In doing so, it compiles the available scholarly evidence, assesses its robustness, identifies gaps in current knowledge and embeds it in a broader, international context.

The status quo report will also be the foundation for the recommendations on how to improve science communication in Switzerland, which is the second part of the expert group’s mandate.

Inviting Your Feedback on this Chapter

The status quo report will be reviewed and validated in different ways: by incorporating prior scholarship, by discussing it within the expert group, and by having the full report peer-reviewed by renowned experts of science communication in Switzerland and internationally.

Another step of this validation is to invite feedback on the report from stakeholders. This feedback will be invited chapter by chapter. The following text is the first draft of the chapter describing research on intermediaries of science communication in Switzerland.

We ask you to give us feedback on this draft chapter. This feedback can refer to all levels, from structural and stylistic aspects to the interpretation of specific scientific evidence. Especially welcome are pointers to scholarly studies, data sets or results that may help us to broaden the basis for the chapter. **Please note that we will be able to consider feedback until the end of October 2020, when we will finalize the chapter.**

You can give public feedback directly in this preprint by setting up an account with hypothes.is. You can also email t.fuechslin@ikmz.uzh.ch, or send regular mail to Dr. Tobias Fuchsli, IKMZ, University of Zurich, Andreasstrasse 15, CH-8050 Zurich.

Thank you for your participation, which is highly appreciated and will help the work of the expert group!

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Journalists, Influencers or Platforms – Intermediaries of Science Communication in Switzerland

Science communication is often mediated: It does not take place between scientists or scientific institutions and the public directly, but intermediaries select, aggregate and communicate science-related content to the public. Different such intermediaries exist, from news journalists over citizen journalists all the way to new individual intermediaries like bloggers and tech intermediaries like social media, search engines or digital platforms like Google or Facebook (for a typology see Keel, 2011, 36ff.).

Science Journalists in Switzerland

News media and journalists have historically played a crucial role in science communication (Nelkin, 1995). They are still one of the most important channels through which people in many countries encounter information that they perceive as science-related (Dunwoody, 2014). This is also true for Switzerland (Science Barometer Switzerland, 2016, 2019). Therefore, it is important who these intermediaries are, how they are organizationally embedded and under what conditions, with which role-perceptions and working routines they research, select and present science-related topics.

What scientific evidence is available?

Amount of data available for CH:

little data on science journalists, while comprehensive data are available on Swiss journalists in general

Quality of data available for CH:

data on science journalists is either dated or not representative/complete, often essayistic and anecdotal insights, compared to comprehensive survey data on Swiss journalists in general

Analyses available for CH:

very few scholarly analyses available for Switzerland; considerable desiderata

Data on Switzerland

Only few studies have analyzed science journalists and science journalism in Switzerland. As a result, little and often dated evidence exists about basic questions like the number of science journalists in the country, their embedding in different media organisations, their working conditions, or the development of these facets over time. Even though several large scale surveys were conducted among journalists in Switzerland (for overviews Hanitzsch, Seethaler, & Wyss, 2019; Keel, 2011, 102ff.), almost none of them specifically address the science beat (e.g. Bonfadelli, Keel, Marr, & Wyss, 2012, p. 20; Dingerkus, Dubied, Keel, Sacco, & Wyss, 2018, p. 124). Only a 2015 survey focused on science journalists specifically (Kristiansen, Schäfer, & Lorencez, 2016), while the few studies that mention science journalism at all do so mostly in passing (Hanitzsch et al., 2019; Keel, 2011; Puppis, Schönhagen, Fürst, Hofstetter, & Meissner, 2014). Beyond that, some essayistic and dated accounts provide more anecdotal evidence about the situation of science journalism (Breu, 2004; Hafner, 2020; Heuss, 2004; Ruß-Mohl, 2012, 2013).

The role of online science journalism warrants more research in Switzerland. Several international studies have pointed towards the positive aspects of the emergence of online, social and mobile media for science journalism – such as the increased opportunities to research topics quicker and more comprehensively, to get more immediate audience feedback on

reporting (e.g. Martin W. Bauer et al., 2013, p. 19), to allow for a more dialogical, participatory journalism (Fahy & Nisbet, 2011, p. 785) and to broaden reporting perspectives (cf. Dunwoody, 2014). These aspects have not been analyzed for Swiss science journalism.

Findings on Switzerland

There are about 100-150 science journalists in Switzerland. For 2009, a report finds that about 60 science journalists worked in the large media houses the German-speaking part of Switzerland, sharing 40 full-time position equivalents (Ruß-Mohl, 2013, 55f.). A 2020 survey of the members of the Swiss Association for Science Journalism (SASJ) reached 179 of its 305 members. Of the 73 “regular” members¹ that responded, only 27 (i.e. 37%) were permanently employed staff journalists, with a further 22 working as freelance journalists – most of them working less than 80% workloads. If these numbers are extrapolated with regards to the official number of 151 “regular” members in the SASJ, this results in about 50 to 60 permanently employed science journalists in Switzerland (SASJ, *forthcoming*).

Science journalists are a small group among all journalists. Overall, journalists who also (albeit not necessarily exclusively) work for a science desk represent 2-6% of journalists in Switzerland (Bernet & Keel, 2002, 2005, 2009; Enquete 2008 cit. in Keel, 2011, p. 145; Puppis et al., 2014; Saxer & Schanne, 1981). The most recent study reports a proportion of about 4% (Lauerer, Dingerkus, & Steindl, 2019, p. 81), and science journalists seem more common at SRG and commercial television than in print media (Keel, 2011, p. 146). These numbers are on par with, and even slightly higher than in, other countries, where studies have estimated the proportion of science journalists to be around 1 to 3% in countries like the US, Germany and Norway (Schäfer, 2011, 403f.).

Science journalists often share their domain with other journalists. It is notable that many journalists who are not working at science desks report that they write about science topics: In Keels survey from 2009, 32,9% of all surveyed journalists across beats said they also covered science; most strongly at SRG (46,1%) compared to commercial TV (33,9%) and print media (29,1%) (Keel, 2011, p. 147). This is even more pronounced in the US, where the “vast majority of articles on emerging technologies are written by reporters whose primary responsibilities do not involve scientific topics”, which may cause problems for issues “such as nanotechnology, that combine complex basic research, high levels of scientific uncertainty, and multifaceted policy dilemmas” (Scheufele, 2013, p. 14042).

Science journalists in Switzerland have a higher formal education than other journalists but are less likely to be employed full-time. Kristiansen et al. (2016) surveyed 78 (mostly German speaking) science journalists in Switzerland in 2015. While they were shown to be similar to those in other countries socio-demographically, they differ from the general population of journalists in Switzerland: science journalists are more likely to have a university degree and less likely to be permanently employed. As a result, more of them have a secondary occupation.

¹ According to the SASJ, “regular” members are active in journalism, i.e. permanent employees and freelancers who earn a substantial part of their livelihood from journalism. “Extraordinary” members work in the broader field of science communication, e.g. in communication departments for universities and research institutes, are retired, work as journalists in other beats and/or pursue the career goal of science journalism.

Science journalists aim to provide objective information and orientation, and less to be watchdogs. A large majority of Swiss science journalists consider themselves objective mediators. On a scale of one (“not at all important”) to five (“very important”) depicting reality as it is (4.85) and providing their audience with necessary orientation (4.58) are among their most important self-conceptions. Fewer science journalists in Switzerland see themselves as watchdogs aiming to identify and publicize erroneous developments and problems within science (3.73). Overall, Swiss science journalists’ self-conceptions are similar to those of other Swiss journalists (Kristiansen et al., 2016, 134f.)

Science journalists are facing significant changes in the changing media ecosystem. Media generally are under economic pressure in Switzerland (e.g. Künzler, 2013; Puppis et al., 2014; Widmer, 2020), and in accordance with it, journalists’ working conditions worsen with increasing workloads, decreasing personal and professional freedom and less time to research stories. As a result, more journalists only work temporarily and part-time (Dingerkus et al., 2018, p. 122).

Anecdotal evidence suggests that these trends are also true for science journalism: Legacy media in Switzerland seem to allocate fewer resources to science journalism by closing down science desks and relying more on freelancers (Demuth, 2013; Heuss, 2004); working conditions for science journalists are getting worse, time is getting more scarce, clear deadlines give way to a “24/7 rhythm of the internet” (Ruß-Mohl, 2012, p. 99), and media re-print agency copy more often (Heuss, 2004; Vogler & Schäfer, 2020). This is paired with the observation that science desks are perceived as of minor relevance in media houses in Switzerland (Dietrich-Gsenger, Marlene, & Seethaler, 2019, p. 69) – like they are in other countries (e.g. Nelkin, 1995).

Figure 1: Responses of 78 science journalists in Switzerland in a 2015 survey (Kristiansen et al., 2016, p. 138)

Kristiansen et al.’s survey of 78 science journalists in Switzerland in 2015 shows that this diagnosis is mirrored in the journalists’ self-perceptions (Figure 1). While most science journalists are content with their job, with their profession at large and with their work’s quality, they also indicate that working conditions have worsened in the five years prior to the survey: They are expected to produce output more efficiently nowadays, their media houses’ financial stability has decreased, and competition in science journalism is intensifying. The same journalists, however, do not think that their field will default to ‘cut, paste, and

translate' journalism, but anticipate that an increase in PR will increasingly set the agenda and lead to lower quality. These views are held by most survey participants except SRG journalists (specifically from the German-speaking branch of SRG), who perceive fewer changes in their personal working conditions than colleagues from other media, even though they do perceive that "working conditions in journalism are changing in general", and "permanently employed journalists perceive more significant changes in their personal work than freelancers do, which could be a sign of the media crisis hitting publishing houses and/or science desks." (Kristiansen et al., 2016, 135f.)

This is mirrored globally: In many countries, the traditional business model of legacy media is in crisis, and seems to hit specialist journalism – like science journalism – the hardest (Allan, 2011; Dunwoody, 2014; Schäfer, 2017a). Fewer science desks and science journalists are available, and the working conditions for those who remain in media houses are worsening (Martin W. Bauer & Gregory, 2008; Friedman, 2015): Science "journalists have seen the number of items they work on in a given week increase over the past five years. They are not just doing more reporting, but more types of reporting. Many are now being asked to provide content for blogs, web stories and podcasts – something they weren't doing five years ago." (Brumfiel, 2009, p. 275).

Switzerland is still trying to find a sustainable model to resolve the crisis of science journalism. Similar to other countries, where new models of science journalists are tried out, searching to balance editorial independence and quality with economic feasibility and sustainability (for overviews Dunwoody, 2014; Fahy & Nisbet, 2011), new organizational models of science journalists have been tried in Switzerland (Table 1). So far, none of these (partly ongoing) models have alleviated the increasing worries of science journalism in Switzerland (Amrein & SKWJ, 2020).

Philanthropic science journalism for legacy media

"20 Minutes", the daily newspaper with the largest circulation in Switzerland, was an example for *philanthropic science journalism*: As the newspaper does not have a science section or science desk, the Gebert Rütli and Mercator foundations funded the "Scitec-media" communications agency to produce two weekly "Knowledge" pages for "20 Minutes". This content was ready made, written and layouted by Scitec, and printed by the newspaper free of charge (Ruß-Mohl, 2012, p. 96).

Institutionally funded science journalism from news agencies

KEYSTONE SDA

The Swiss news agency Keystone-SDA (formerly SDA) is an example for *institutionally funded science journalism*: Its two science journalists were initially paid by CRUS - the Association of Swiss University Rectors, and are now funded by swissuniversities, the Science National Science Foundation (SNSF), the Swiss Academies of Arts and Sciences and the ETH-Rat (Demuth, 2013). The amount of science-news produced by Keystone-SDA rose by 38% within one year after the establishment of the "SDA Wissenschaftsdienst" in 2008 (Schanne, 2010).

Online-born science journalism with diverse funding sources

In French-speaking Switzerland, “Heidi.news” is trying to establish an ad-free and primarily subscription-based funding model for its mixture of topical feeds and “explorations” and multimedia articles (Hirschi, 2019). It also draws on financial support from additional reader donations and philanthropic funding from foundations.

In German-speaking Switzerland, “Higgs.ch” has set up an online-platform focusing on science journalism that both allows content from other providers to be incorporated and aims to distribute its own content not only via its website, but via diverse outlets from local and regional newspapers over social media to video screens in public transport (Weißschädel, 2018). Higgs.ch is ad-free and has a funding model combining sponsored content with funding from individual readers, philanthropic organisations, private und public institutions.

Relying on novel and mostly international services for (science) journalists

Journalists reporting on science topics can use services such as the “Science Media Center Germany” which delivers raw material such as quotes and fact-sheets for science-related reporting free of charge, “The Conversation” in France, which provides free articles on contemporary issues written by academic experts, or web portals aggregating media releases from research and higher education institutions such as “EurekaAlert” or the “Informationsdienst Wissenschaft” (idw).

Table 1: Models of science journalism in Switzerland

New Intermediaries of Science Communication – From Individual Influencers to Digital Platforms

Apart from established news media journalists, novel individual and platform-based intermediaries have emerged with the rise of online, social and mobile media. These new intermediaries include individuals such as citizen journalists (Allan & Ewart, 2015), bloggers (Ashlin & Ladle, 2006; Joosse & Brydges, 2018), YouTubers (Allgaier, 2020) and influencers (Alison Anderson, 2011), taking on factchecking, journalistic roles, providing orientation and/or content evaluation in light of scientific evidence (Graves, 2013; Schäfer & Painter, 2020). They also include digital platforms like Google, Facebook, or Weibo, who curate content largely algorithmically and have become some of the most important intermediaries of public communication (Helmond, 2015, 5; Napoli, 2015). Platforms appear in different shapes and primary functions such as search engines, news aggregators and social media, but can generally be understood as programmable infrastructures with a primary focus of spreading and collecting data. As such they can steer communication towards or away from certain topics, voices or positions, and they do so by following rationales that differ from traditional intermediaries like journalists (Gillespie, 2010; Helmond, 2015, 5). This also directly affects science communication: Scientific interactions are more visible since scientists and scientific organizations use both scholarly and public social media, while strengthening parts of academic knowledge production, including citizen science efforts, are platform-based (Franzen, 2020; Mirowski, 2018). As a result, platforms are likely to influence scientific

practice, content, and discussion through mechanisms like algorithmic curation, data collection and supply, and potential interference by (social) bots, all of which might produce new and potentially problematic outcomes for science communication (Brossard, 2013; Leßmöllmann, 2020; Schäfer, 2017b).

What scientific evidence is available?

Amount of data available for CH:

Little to no data available specifically for CH, limited to anecdotal observations

Quality of data available for CH:

Anecdotal insights on individual new intermediaries, but neither systematic nor representative

Analyses available for CH:

very few scholarly analyses available for Switzerland; large desiderata

Data on Switzerland

Data on the number, characteristics, or diversity of “new” individual intermediaries in science communication in Switzerland is almost non-existent. This is not surprising as international research on the role of these intermediaries is scarce in general, with some exceptions for fact-checkers (Graves, 2016; Lim, 2018), Bloggers (Schäfer, 2012) and case studies on citizen journalists (Allan & Ewart, 2015).

Generally, a plethora of studies is available on the role of digital platforms and the infrastructures they provide on public communication, even though many of these studies are hampered by questions of data access, selectivity and scale. Regarding science communication, however, there are hardly any studies looking at the role of platforms or platform providers, social bots, computational journalism or automated fact checking (Franzen, 2020). The few studies that exist focus on the English-speaking world only (e.g. Hitlin & Olmstead, 2018; Vosoughi, Roy, & Aral, 2018).

Findings on Switzerland

Switzerland has a small yet diverse landscape of individual intermediaries of science communication. While there are no dedicated assessments or inventories of these new intermediaries available for Switzerland, notable examples can be identified: A number of blogs such as “Geschichte der Gegenwart” and “ETH Zukunftsblog” provide platforms for individual bloggers’ content, while individuals such as Lausanne-based Lê Nguyễn Hoang (also known as “Science4All”) have built audiences on social web platforms like YouTube and Twitter. Generally, it seems that a small number of blogs host most of science-related blog posts, similar to the structure of the academic blogosphere in Germany (Fecher & Kaiser, 2015). Judging by ad-hoc follower and interaction comparisons on Twitter, however, their reach and relevance seems limited compared to the followers and subscribers of scientific institutions such as ETH Zurich and EPFL.

But the COVID-19 pandemic suggested that the role of these intermediaries can expand during situations like crises: While established communicators such as governmental institutions (e.g. Federal Office of Public Health), federal expert groups (e.g. Swiss National COVID-19 Science Task Force, 2020) and science journalists (e.g. Heidi.News; Higgs.ch) provided information on the pandemic, a handful of new individual intermediaries such as corona-data.ch emerged, aggregated and visualised data on new infection and subsequent deaths to the public and seemed to have an impact on legacy media and online communication.

Digital platforms provide relevant but less trusted information sources for science communication. More than 80% of people in Switzerland get parts of their news diet online, while 45% get some news via social media such as Facebook, YouTube and WhatsApp (Udris & Eisenegger, 2019). Looking at science-related content, YouTube is one of the most important online channels of contact with science and research, while Facebook and WhatsApp only play a minor role (Science Barometer Switzerland, 2019). However, only 17% of the populations trust news encountered via social media, and 27% trust news they searched themselves online, compared to the 46% who trust the news overall (Udris & Eisenegger, 2019). It remains unclear, however, how much this lack in trust applies to science-related content as well.

It is clear, however that scientific content plays a relevant role online: According to Science Barometer Switzerland (2019), 43% of people do look up scientific information (online and offline) and, based on google trend data, they do so frequently: For example, the German-language search volumes in Switzerland for the science-related topics “Science”, “Research”, and “Technology” are on par with “Politics” and “Economics” (Figure 2). Notably, all these topics drastically shrink in relevance when compared to topics such as “Sex”, “Sports”, and the single keyword “Netflix”.

Figure 2: Example of relative volumes of Google searches for (science-related) topics in Switzerland over the last five years, as aggregated and provided by Google Trends.

Digital platforms facilitate mis- and disinformation on various scientific issues online. Scholars describe technologies and technological agents as crucial for the spread of (alleged) misinformation through social networks (e.g. Chan, Jones, & Albarracin, 2017). Examples are social bots, i.e. programs or “social robots” that emulate human behaviour and automatically create content in online environments (Woolley & Howard, 2019), but also the algorithmic selection and curation of online content, and robot journalism (Carlson, 2015; Tsvetkova, García-Gavilanes, Floridi, & Yasserli, 2017). A large scale survey suggests that bots are involved in spreading false information but that many other factors lead to the fact

that falsified information spreads faster through Twitter than fact-checked information (Vosoughi et al., 2018).

In science communication, there are three recent studies that touch upon the prevalence of social bots on Twitter: Newman (2017) and Hopke and Simis (2017) analysed Twitter communication on the IPCC's Fifth Assessment Report and on the issue of fracking respectively and suggest that (social) bots represent about 2-5% of accounts and mentions in these communication environments. A third study analysed the influence of social bots on the vaccine discourse (Broniatowski et al., 2018). The study analysed content rather than absolute bot prevalence and concluded that bots had a "significant impact on online communication about vaccinations" (Broniatowski et al., 2018, p. 1382). It remains unclear, nonetheless, how relevant social bots are in science communication.

Digital platform architectures influence user perceptions and actions, which are relevant and often undesirable for science communication. On the one hand, platforms like Google and Facebook and the drastic effects of their algorithmic content distribution lead to diagnoses of news consumption in an "echo chamber" of self-reaffirming views and opinions (Anspach, 2017; Bakshy, Messing, & Adamic, 2015; Beam, Hutchens, & Hmielowski, 2018). However, this diagnosis has been contested in recent studies, mainly from the field of political communication research, which highlight the concentration on a few news providers as the more prevalent problem (Haim, Graefe, & Brosius, 2018; Jacobson, Myung, & Johnson, 2016; Schmidt et al., 2017; Trielli & Diakopoulos, 2019).

On the other hand, platforms provide an environment that is likely to affect the perception of science-related content: A large-scale study showed that the sheer volume of exposure to online content on Facebook potentially affects people's moods and very likely affects the kind of content they post themselves (Kramer, Guillory, & Hancock, 2014). Other studies showed that the comments and other social cues such as likes and upvotes posted alongside the main content (e.g. articles on nanotechnology and drugs) bias readers' evaluation of the main content (A. A. Anderson, Brossard, Scheufele, Xenos, & Ladwig, 2014; Winter, Brückner, & Krämer, 2015).

Digital platforms offer opportunities for science communication. Several platform-driven mechanisms are likely to positively affect science communication (National Research Council, 2014). First, platforms have been linked to increased political participation in the real world (M. Chan, 2016; Valenzuela, Bachmann, & Bargsted, 2019). It remains to be seen whether this effect extends to engagement on science and research. Second, platforms make it easier to share and spread content. Combined with their algorithmic recommendations, this allows for content to go viral and be rapidly spread across many communities and countries. Researchers are trying to identify the characteristics that content needs to spread across different platforms (Goel, Watts, & Goldstein, 2012; Heimbach, Schiller, Strufe, & Hinz, 2015), and it seems that science content is among the content types that are more likely to produce viral content (Bright, 2016; Milkman & Berger, 2014). Third, platforms like Google not only collect and store but also give public access to data, which can be valuable both for researchers and interested individuals (Le Nghiem, Papworth, Lim, & Carrasco, 2016).

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