ELEPHANT
IN THE LAB

OPINION

Science is the search for truth and knowledge

Short title	Science is the search for truth and knowledge
Long title	Science is the search for truth and knowledge. Critique and improvement of ethics in science
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Science is the search for truth and knowledge. Originality and autonomy are its lifeblood. Science only becomes science by a bona fide treatment of data, facts, and intellectual property.

1) *The basic rules of scientific work have to remain unchanged*

Relevance and reputation of science are critically determined by the adherence to immanent ethical principles. Plagiarism, data manipulations, and falsified studies discredit science. Even though they might only be exceptions, they not only damage the image of the culprit, but also that of universities, research institutions and of science as a whole. Only those have a claim to

participation in the scientific discourse, who respect the rules of good scientific practice, developed from within science itself. At this, anyone who deliberately overlooks malpractices is himself guilty of misconduct, unlike the whistle-blower, who, with honest intentions and often taking high personal risk, helps to uncover misconduct.

The basic rules of scientific work are nearly identical in all scientific disciplines and have to remain unchanged in an increasingly digitalized and interconnected world. The highest principle is honesty towards oneself and others. Scientific results and the underlying data have to be as precisely documented and verifiable as the interpretation steps and their sources. The readiness to rigorously doubt one's own results must remain a matter of course.

Scientific arguments and judgments must only be contended after appreciation of the counterarguments. This excludes reviews given as courtesies. Science is free of instruction. Its impartiality is under constitutional protection.

2) *Reduction of mistrust by the highest possible degree of transparency*

It is also true, however: scientific research and expert judgment are subject to manifold attempts of illegitimate influence. This is the case especially where voicing a scientific opinion or communicating a scientific research result has substantial economic and political consequences. If nationalist and populist movements, which make no secret of their contempt for science, are on the rise in the western world, mistrust towards scientific impartiality is growing in general. According to a recent survey, in Germany only every second has trust in science, while twelve percent mistrust or rather mistrust science, and the remainder is undecided. As the main reason for their doubts, most referred to the dependence of researchers on funders (see Wissenschaftsbarometer 2017).

More than before, science has to address the suspicion of it being led by personal interest rather than search for knowledge by displaying the highest possible degree of transparency. Conflicts of interest and the names of sponsors or supporters of a research project must be disclosed in all cases. Beyond that, scientific journals have to announce, which support relationships of the author underlie a given publication or demand the respective information from the author. Cooperation agreements, which institutions of higher education close with companies, have to be made available to the public. It has to be made comprehensible for the public that the sponsor cannot have any influence on either research and teaching or the publication of research results. Temporary deviations from the transparency mandate must be possible, but subject to justification and restricted to exceptions, for example when there is a proven risk of breaking trade secrets. A permanent confidentiality agreement must not be possible in the case of university research.

3) *Less competition pressure by sufficient basic funding*

State and society have to protect and promote the impartiality of science. They have to provide an environment which allows for impartiality. Impartiality and independence are mutually

dependent. The independence of science requires sufficient basic funding of research and teaching. This is lacking, however: the funding of the German higher education system has markedly deteriorated despite important special programs in the last 20 years. Universities finance themselves increasingly from temporary projects and third-party funds, which supports an incentive structure based on economic aspects alone. The continuous pressure to increase the ratio of third party funds and a personal payment according to parameters like funding, graduations, and publications have drawbacks, which do not exhaust themselves in the steering of science, but also promote unethical scientific behavior indirectly. The aggravation of the competition for funds and the dependence of scientific careers on quantifiable achievement parameters increases the danger of unethical scientific behavior. To be sure, a sufficient basic funding of universities by federation and states will not completely prevent scientific misconduct. However, a systematically relevant decrease in competition pressure can contribute to substantially reducing it.

4) *Discipline-specific ethics as part of compulsory curricula at universities*

Science is in the service of humans and is unthinkable without ethical guidance. Already in the first semesters, ethical questions should be included in the curriculum of every university study. Students, who as future functional elites carry a responsibility outside of science as well, must be made acquainted with ethical questions early and comprehensively during their studies. Discipline-specific ethics with a relation to the respective scientific history should thus be part of compulsory curricula at all German universities.

References

Wissenschaftsbarometer 2017. Wissenschaft im Dialog: LINK (last access: 3rd July.2018)