**From Science to Freedom of Speech. Addressing Controversial Issues (in the Classroom)**

**Module structure**

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| **TEACHING HOURS**  **(45 min each)** | **TIME NEEDED** | **CONTENT & TEACHER ACTIVITY** | **STUDENT ACTIVITY** | **RESOURCE / METHOD** |
| 2 hours  ***Session 1: Science and its role in relation to controversial issues*** | 30 min | Metaphorical activity: photos  *Prior to the lesson:*  1) For the first lesson, the lecturer asks students to prepare photos (ideally with creative commons license) which resemble controversy for them.  *During the lesson:*  2) The lecturer introduces the overall topic and provides a brief overview (S1, slide 2). As an initial activity, students are now asked to present the photos they have prepared; first ideas are gathered  3) followed by a brainstorming activity in pairs, which is guided by the following two questions (S1, slide 4):   * What makes an issue controversial? * What’s the relationship between science and controversial issues?   The activity in pairs is followed by an exchange on the findings in plenum. The lecturer summarises on the flipchart/digital whiteboard and uses slides 5-7 to add further remarks. | *Prior to the lesson:*  1) students are asked to prepare a photo which resembles controversy.  2) In class, these photos are presented.  3) The students are then split into pairs, are asked to take notes and afterwards briefly present their findings in plenum. | PPT  Photos  Breakout rooms  Flipchart and/or digital whiteboard |
|  | 30 min | Activity: False balance? Examining an example from procon.org  S1, slide 8: As an alternative, the questions can be discussed in plenum, followed by an activity focusing on the notion of “false balance”.  1) Students are asked to check the site <https://climatechange.procon.org/> and share their perception of the page:   * How does the site portray climate change and research about it? * Does the presentation resemble the scientific consensus about humans’ primary responsibility for climate change?   2) Afterwards the issue of false balance can be discussed/addressed and f.e. illustrated using [this video from LastWeekTonight](https://www.youtube.com/watch?v=cjuGCJJUGsg&t=2s).  In a second step, a discussion on the overall impression of this page and the application of the pro-/con-approach in class can be discussed. | Review of the website [https://climatechange.procon.org](https://climatechange.procon.org/) | PPT  Speakers |
|  | 30 min | Presentation - approaches to science communication:  The lecturer introduces different approaches how science is communicated towards the public (S1, slide 9-11).  Questions for discussion and further information are provided in the speaker notes sections of the respective slides within the ppt. | The students discuss the models in plenum. | PPT |
|  | Alternative activity | H5P Drag’n’Drop:  Students are asked to conduct H5P drag’n’drop activity “Approaches to Science Communication” by themselves to repeat the content of the session and validate their knowledge. | Students conduct H5P activity by themselves for repetition. | H5P activity prepared on elearning platform |
|  | **Self-study material for lesson 1:**  As a homework activity, students can be asked to read the following texts and prepare an abstract for one chosen publication:   * Brossard, D. and Lewenstein, B. V. (2010) A Critical Appraisal of Models of Public Understanding of Science, Using Practice to Inform Theory. In: Kahlor, L. and Stout, P. (eds.), Communicating Science, New Agendas in Communication, New York: Routledge, pp. 11-39, doi:10.4324/9780203867631 * Lewenstein, B. V. (2003) Models of public communication of science and technology. Proceedings of the National Academy of Sciences. 118. e1912436117. doi:10.1073/pnas.1912436117. * Schmid-Petri, H. and Bürger, M. (2020) 5 Modeling science communication: from linear to more complex models. In: Leßmöllmann, A., Dascal, M. and Gloning, T. (eds.), Science Communication, Berlin, Boston: De Gruyter Mouton, pp. 105-121. doi:10.1515/9783110255522-002 | | | |
| 1 hour  ***Session 2:* Scientific Literacy** | 30 min | Activity: Ten Commandments of being scientifically literate  The lecturer presents the topic of the lesson (scientific literacy) and sends students into small groups of 3-4 people (10 min). Students should reflect about the meaning of scientific literacy and are asked to come up with “Ten Commandments of being scientifically literate”.  Afterwards the padlet is shared with all students, findings are presented and further input is given (see below). | Activity in plenum or in small groups of 3-4 students: come up with “10 Commandments of being scientifically literate” and take notes on a flipchart or (if conducted online) in a padlet.  Presentation of results. | PPT  Breakout rooms  Padlet (padlet with 1 column per group should be prepared in advance) |
|  | 15 min | Different approaches to scientific literacy:   1. Input through the lecturer:  * Definitions (S2, slide 5-6) * Input vision I-III (see slides 7 to 10 for support, if not familiar with the discourse, it is helpful to study the literature outlined below prior to the session)   2) Discussion in plenum (can be turned into self-study activity): Which vision would they identify as being in line with their (future) teaching/in which vision would participants locate themselves? What could be obstacles of these visions? | After the lesson: students can be asked to write a short commentary to answer the question which vision they would identify as being in line with their (future) teaching/in which vision participants would locate themselves. | PPT |
|  | **Self-study material for lesson 2:**   * Dickson, D. (2005) The Case for a ‘deficit model’ of science communication. Science and Development Network, <https://www.scidev.net/global/editorials/the-case-for-a-deficit-model-of-science-communic/>, accessed 9 August 2021. * Hodson, D. (2010) Science Education as a Call to Action, Canadian Journal of Science, Mathematics and Technology Education; 10:3, pp. 197-206, doi:10.1080/14926156.2010.504478 * Howell, E. and Brossard, D. (2021) (Mis)informed about what? What it means to be a science-literate citizen in a digital world. Proceedings of the National Academy of Sciences. 118. e1912436117. doi:10.1073/pnas.1912436117. * McGlynn, T. (2020) The deficit model of science communication. Small Pond Science, <https://smallpondscience.com/2020/01/18/the-deficit-model-of-science-communication/> , accessed 9 August 2021. * Roberts, D. (2007) Scientific literacy/science literacy. In: Abell, S. and Lederman, N. (eds.): Handbook of research on science education, Mahwah: Lawrence Erlbaum Associates, pp. 729-780. * Siarova, H., Sternadel, D. and Szőnyi, E. (2019) Science and scientific literacy as an educational challenge. Research for CULT Committee. Directorate-General for Internal Policies of the Union (European Parliament). doi:10.2861/2088 * Sjöström, J. and Eilks, I. (2018) Reconsidering Different Visions of Scientific Literacy and Science Education Based on the Concept of Bildung. doi:10.1007/978-3-319-66659-4\_4. | | | |
| 1 hour  ***Session 3: “Refined” models of Scientific Literacy and Opinion formation*** | 15 min | The lecturer presents two “refined models” of scientific literacy (S3, slide 4-6). |  | PPT |
| 30 min | A focus is now put on opinion formation.  1) The lecturer presents slide 7 (it is advisable to consult the literature outlined in the slide notes or in the section for self-study below).  2) The presentation can be followed by a 15 minute free writing session based on the question, whether students have noticed these dynamics with themselves as well and if so when/in connection to which topics? | Students are asked to do a 15 minute free writing activity to reflect upon their own experiences. | PPT |
|  | **Self-study material for lesson 3:**  Further reading (opinion formation):   * Fasce, A. and Picó, A. (2019) Science as a Vaccine. The Relation between Scientific Literacy and Unwarranted Beliefs. Science & Education, 28, pp. 109-125. doi:10.1007/s11191-018-00022-0. * First Draft (2020) The psychology of misinformation. First Draft, 27 August, <https://firstdraftnews.org/long-form-article/the-psychology-of-misinformation/>, accessed 19 August 2021.Hendriks, F. and Kienhues, D. (2019) 2. Science understanding between scientific literacy and trust: contributions from psychological and educational research". In: Leßmöllmann, A., Dascal, M. and Gloning, T. (eds.), Science Communication, Berlin, Boston: De Gruyter Mouton, pp. 29-50. doi:10.1515/9783110255522-002. * Howell, E. and Brossard, D. (2021) (Mis)informed about what? What it means to be a science-literate citizen in a digital world. Proceedings of the National Academy of Sciences. 118. e1912436117. doi:10.1073/pnas.1912436117.McGlynn, T. (2015) People are irrational. Small Pond Science, <https://smallpondscience.com/2015/06/22/people-are-irrational/>, accessed 9 August 2021. * National Academies of Sciences, Engineering, and Medicine (2017) Communicating Science Effectively: A Research Agenda. Washington, DC: The National Academies Press. doi:10.17226/23674. | | | |
| 2-3 hours  ***Session 4: Controversial Issues I*** | 25 min | 1) The lecturer introduces the overall topic and provides a brief overview (S4, slids 4-5).  2) The lecturer forms four groups or prepares breakout rooms and initiates a brainstorming session based on the questions indicated in the slide notes of slide 6).  3) The group activity is followed by an exchange on the findings in plenum. The lecturer summarises on the flipchart/digital whiteboard. | Four Groups collect controversial topics based on brainstorming questions and write them down on posters/whiteboards.  The posters are presented, open questions are clarified and similar topics are summarised. | PPT  Breakout rooms  Posters or whiteboards (f.e. Jamboard) |
|  | 5-10 min | Activity: Hot or cold topics?  The lecturer distributes 9 points, 3 each in 3 different colours to each student and explains the different colours (S4, slide 7). | Each students awards the 9 points individually  → distributed over all 4 posters/whiteboard pages. | PPT, Posters/whiteboard, either stickers in 3 different colours, or alternatively, the points can also be painted with different colours on the posters/whiteboards. |
|  | 25 min | Activity: Follow-up on the points awarded: Which topics evoke the most emotions, which ones don't?  1) The lecturer forms small groups around the hottest controversial topics and introduces the guiding questions for the group discussion (S4, slide 8).  2) The group activity is followed by *a* presentation of the small group discussion. | Students discuss questions related to the hottest topics. The most important factors that influence a topic, make it controversial and evoke emotions are collected on a poster/whiteboard. | PPT  Breakout rooms  Posters/whiteboard |
|  | 30 min-1h | Activity: Change of perspective: Slip into another's shoe (cf. S4, slide 9)  A controversial topic is selected by the lecturer and/or the students. The lecturer explains the activity to the students, redistributes the shoes/feet and guides through the discussion.  *Depending on the time available, only selected participants take part in the discussion and the other students are observing the discussion. Otherwise, the discussion can be repeated several times with different participants/topics.* | Students draw an imprint of a shoe/ boot, cut it out and write catchwords for a fictional position related to the hot topic (e.g. conservative, liberal, experts, …) on the cut-out.  The students take on a new role and discuss the controversial topic according to their new position.  The students step out of their roles and start a reflection based on guiding questions (S4, slide 8). | PPT  Paper  Scissors |
|  | 15-30 min | Activity: How could a consensus / compromise be found?  The lecturer guides a joint discussion among all students based on the questions (S4, slide 10). | Students participate in the joint discussion. | PPT |
| 2-3 hours  ***Session 5: Controversial Issues II – Freedom of speech*** | 15-20 min | Individual exercise:  The lecturer introduces the overall topic and provides a brief overview (S5, slide 4-6). The lecturer explains the individual exercise (S5, slide 7).  Teachers collect the cards and keep them for later. | Each student thinks about the questions raised by the lecturer (slide 7) for him-/herself (and takes notes, one card per reason and per example). | PPT  Cards |
|  | 30-40 min | Research activity: freedom of expression in the constitution  1) The lecturer explains the activity and divides the students into smaller groups/breakout rooms (S5, slide 8).  2) The group activity is followed by a presentation of the respective parts of the documents that deal with freedom of expression and the results of their discussions.  Keywords are collected for the questions (S5, slide 9) and supplemented by the keywords collected in the introductory considerations on freedom of expression. | Smaller groups of students start a research about the reference to freedom of expression in official documents like the constitution, the charter of Fundamental Rights of the European Union, ….  The results of the research will be presented to the other students. | PPT  Documents  Breakout rooms |
|  | Alternative activity | As an alternative to working with the documents, videos can also be used and discussed based on the questions outlined in the description above or in the slide notes (S5, slide 9). | Students choose one of the videos and try to answer the outlined questions. | Video-links  Breakout rooms |
|  | 30-40 min | Activity: Guidelines (cf. S5, slide 10)  The lecturer explains the activity and forms smaller groups of students/breakout rooms.  The group activity is followed by a presentation of the respective guidelines and a discussion of them. | Small groups (approx. 4-5 students per group) reflect on, discuss, and create guidelines related to guiding questions (S5, slide 10) that are presented on posters/a whiteboard. | PPT  Posters  Whiteboard  Breakout rooms |
|  | 10-20 min | Activity: Social Media Message (cf. S5, slide 11)  To conclude the session, students should articulate why freedom of speech is important through a social media post/message. | The students send a Twitter message, a Facebook, Instagram or TikTok post in which they summarise why they think freedom of expression is important! They are also welcome to use pictures for the activity. | PPT |
| *Self-study/Further Material* | *Other groups of students could research the treatment of freedom of expression in other documents:*   * *Constitution of other countries* * *Charter of Fundamental Rights of the European Union* * *Universal Declaration of Human Rights International Covenant on Civil and Political Rights (ICCPR)* * *The Constitution of UNESCO* * *UN Convention on the Rights of the Child School rules* * …. | | | |
| 1 hour  ***Session 6: Summary and presentation of results/key take-aways for the classroom*** | 20 min | Activity: Groupwork – where do we encounter scientific findings in our everyday lives? (S6, slide 4)  1) Students are divided into two groups. Each group discusses one of the following questions and takes notes either on a flipchart or in a padlet:   * Where and in which context do you encounter scientific knowledge (outside of university)? * Where do students/adolescents encounter science or traces of scientific knowledge? What/who are their sources?   2) Comparison of the findings in plenum. The lecturer summarises on the flipchart/digital whiteboard and uses slide 5 (S6) to add further remarks (see also slide notes). | Activity in two groups: discuss the outlined question and gather results on a flipchart or (if conducted online) in the padlet. | PPT  Breakout rooms  Padlet (padlet with 2 columns should be prepared in advance) |
|  | 15 min | Presentation: guiding questions for the classroom (S6, slide 6-7)  The lecturer presents guiding questions are based on the prior lessons that can be taken into account when preparing classroom activities |  | PPT |
|  | Alternative activity | Activity: Take-aways put into practice  In a last step, students are asked to put these takeaways into practice (S6, slide 8). | Students are asked to come up with a lesson plan outline, taking into account the takeaways (S6, slide 6-7). They should be provided with the description of the activity included in slide 8. The idea is that students have time to come up with ideas, which are then uploaded on the e-learning platform using a workshop/ feedback-tool and which could serve as a final activity. Students can feedback each other as well or, if there are further lessons at hand, the results could be presented and discussed in class. | Workshop-/Feedback-Tool  List of resources |
|  | 10 min | Activity: Feedback & Recap: Fun Tree (S6, slide 9-10)  The lecturer draws a tree on a poster/whiteboard and explains the activity to the students. | Students write comments about what they have learnt on different coloured post-it notes and attach them to the ‘tree’ (if conducted online, the lecturer can f.e. use Jamboard where students can attach virtual post-its!) | PPT, Poster/whiteboard  Post-it notes in 3 different colours or alternatively tool such as Jamboard |