



INTEGRITY

Animal Experimentation



This project received funding from the European Union's Horizon 2020 Research and Innovation programme under grant agreement No 824586



Session Overview

This session aims to equip students with the knowledge to comprehend the meaning and importance of research integrity. This will be achieved through a practical hands-on approach, where real and fictional cases, outlining research integrity issues in biomedical research using animals, will be presented. We aim for students to identify and relate such examples of research misconduct and questionable research practices, with their own school work practices and environment. This will engage students in a group discussion and critical reflection about the importance of acting responsibly and with honesty in their own school work and within their life.

Learning Outcomes

- To comprehend the key concepts and ethical issues in animal experimentation
- To comprehend and describe the steps involved in the research process
- To explain the meaning of research integrity and the four principles
- To explain the meaning of research misconduct and questionable research practices, and relate such practices with students' school work practices
- To explain the importance of avoiding such practices in school work and life





Background to the theme

Animal experimentation is a controversial topic that raises **key ethical questions**, particularly concerning **animal welfare**. Animal experimentation



is defined by the use of non-human animals in experiments, where the aim is to control a set of variables or procedures that will affect the tested animal, so that the result can be translated into human or animal biology. It is applied in **biological and biomedical research, in toxicology and safety testing and in teaching**, at higher education level only. The main purposes have been to improve the knowledge about certain diseases affecting humans or animals, to test the safety of new chemical and pharmaceutical products and to test new medicines or treatments or medical procedures. Animals have also been used to improve the knowledge about the basic biology of humans or animals. Experimentation with animals are regulated by the **Directive 2010/63/EU**. It sets the norms and guidelines regarding which experimental and methodological procedures are allowed and which animals can be used (i.e. mice, rats, fish, guinea pigs, rabbits, frogs, cats, dogs, hamsters and, only for conservation and certain biomedical studies, primates; the use of wild monkeys is forbidden). The directive aims to minimize the number of animals used and avoid pain, distress, suffering and lasting harm. Thus, **animal welfare** is an important consideration in animal experimentation, where only trained people are allowed in the animal facilities and to perform experiments on animals. In addition, animals are kept in proper housing conditions (e.g. cages) with close monitoring of their health and environmental conditions, and daily provision of food and water. **Anaesthesia** is always recommended to avoid any pain, suffering or distress to the animals and death as an end-point should always be avoided. Yet, if animals are too ill or are in too much pain, they should be euthanized, but most research in animals cause mild pain, similar to pets that are brought to the vet. Consequently, most claims stating that animal experimentation causes severe pain and that animals are badly treated are simply false, since experiments are strictly monitored and performed to minimise any pain and suffering to the animals. Moreover, **animal experimentation benefits not only humans but also animals**, by improving the knowledge of their basic biology and developing and testing the safety of new drugs and medical treatments. Nevertheless, the **harm-benefit balance** raises **key ethical considerations**, with people sharing different views on the justifications for using animals in experimental research.



The **research process** involves key steps: **design, methodology, experiment, data analysis and the reporting of the findings**. Each step involves a series of aspects that should be considered to produce accurate and trustworthy findings. These aspects include a literature search to acquire further knowledge on the scope of the study, design a proper methodology and experimental setting (e.g. decide on the variables to use, the statistical test to apply, the number of animals to use, etc.) and choose the most practical, reliable and desirable animal, taking into consideration that knowledge about animal biology is key and the chosen animal will influence the results.



Research integrity means conducting research with responsibility and honesty so that others (e.g. the general public or the scientific community) have trust and confidence in the methods that were used and the findings that were reported. In the same way, students should act responsibly and with honesty, when doing and presenting their schoolwork, so that the teacher and peers can trust in the shared knowledge. There are four guiding principles stating how to conduct research with integrity: **Reliability, Honesty, Respect and Accountability**. **Reliability** refers to the quality of the research to secure confidence in the findings that are reported. **Honesty** in research means being transparent, fair and unbiased in all aspects of the research process. **Respect** concerns not only being respectful to other people (e.g. other researchers, students, academic and non-academic peers) or institutions (e.g. Research Centres, Universities, Schools and Funding Agencies) but also being respectful to the object of the research (i.e. humans, animals, natural environment, society, etc.). **Accountability** means assuming responsibility for the research. Whether this relates with working with other people in different tasks of the study, or acknowledging that training is needed for people to perform certain tasks and providing those training options, or to assume responsibility for the findings that are reported, or to take responsibility to answer questions (e.g. from other scientists) regarding the research, being always honest, accurate and transparent.



Research misconduct refers to three actions that show a deliberate intention from the researcher engaging in them. These are **Plagiarism, Falsification and Fabrication**. **Plagiarism** refers to the appropriation of another person's ideas, results, processes or written material, without acknowledging it. **Falsification** refers to the manipulation of research materials, equipment or processes, or changing or omitting data results from an experiment, compromising the accuracy, transparency and reproducibility of the study. **Fabrication** refers to making up data or results and recording or reporting them. Students can relate with these three practices when, for example, they **copy at an exam**, or **write down numbers in schoolwork** that did not result from any experiment or measurement, or when they **modify a written work**. There are other research practices that can also compromise the credibility and trust in the findings from studies. These are often more subtle and difficult to prove an intention from the researcher. These practices are known as **questionable research practices**. Examples of questionable research practices relate to **authorship and collaboration issues**. For example, when authors, who have not contributed to the study, are added to improve the chances of having the study accepted for publication or authors, who have made a significant contribution to the study, are not given credit. Students can relate with authorship and collaboration issues in, for example, a group work assignment, where only one student did all the work, while the peers, who have not contributed to the assignment, have their names in it. Issues regarding **drawing from the work of others** and **collection, analysis and reporting of data** may also reflect questionable research practices. These can be seen in animal research when relying on experimental data collected by other researchers, or the statistical method applied could not be used to that particular set of variables, or the researchers omit any data or relationships established from the data analysis, to prove that a particular relationship is the only one found to answer the research hypothesis. Students can relate to such practices, when, for example, in a school project, they only include work that corroborates the idea they want to demonstrate. In the same way, in schoolwork that involves collecting questionnaires, students stop collecting questionnaires when they think they have all the data needed. Yet, the decision to stop collecting data did not result from a validated methodology.



Key Words

Animal Research | Data | Ethics | Honesty | Integrity | Plagiarism | Responsibility | Schoolwork

Timeline Overview

Structure	Duration (90 minutes)
Part 1 - Introduction	30 minutes
Part 2 - Practical Activity	55 minutes
Part 3 - Conclusion/Wrap-up	5 minutes

NOTE: The duration mentioned for each part of the module is just a suggestion. The teacher/facilitator is free to adapt these according to the time available for the class.

ACTIVITY: Part 1 – Introduction:



Activity Introduction for Students	Students will get acquainted with the meaning of animal experimentation, the ethical issues concerning animal welfare and the steps involved in the research process. Students will also learn about the meaning of research integrity and the four guiding principles, the meaning of research misconduct and questionable research practices and the importance of avoiding such practices.
Materials Provided	PowerPoint presentation
Classroom Setup and Guidelines	<p>Classroom Setup: main online class (if online session) or classroom (if face-to-face session)</p> <p>Guidelines: the teacher/facilitator should use the PowerPoint presentation to present the content so students can learn about:</p> <ul style="list-style-type: none"> • Animal experimentation (slides 3-5)



	<ul style="list-style-type: none"> • Animal welfare and the ethical issues (slides 7-9) • The research process (slides 11-13) • Research Integrity: definition and importance, 4 guiding principles and research misconduct (slide 15 – video 1: a link is provided for students to watch the video. <u>Internet connection is required.</u>) • Research Integrity: questionable research practices and examples (slide 16 – video 2: a link is provided for students to watch the video. <u>Internet connection is required.</u>) <p>Before moving within the different topics, we suggest the teacher/facilitator engage students in an interactive discussion, by asking them to explain their perceptions of animal experimentation, the ethical issues and the steps involved in the research process. Students may also explain their perceptions of research integrity, research misconduct and questionable research practices, by providing examples connected with their own school work and life.</p>
Suggested Time	30 minutes
Learning Objective	<p>Students should comprehend and be capable of explaining, by providing examples related to their own schoolwork, the meaning of:</p> <ul style="list-style-type: none"> • Research integrity: principles and importance • Research misconduct and questionable research practices



ACTIVITY: Part 2 – Practical Activity:



Activity Introduction for Students	Students will be organised into 4 groups. Each group will receive an individual board (1 from the 4 available), outlining a specific case of research misconduct or questionable research practices in animal research. Each group will first watch the video mentioned on their board (link and QR code on the board). Students will then relate such actions with their own school practices, by discussing and critically reflecting on two proposed dilemmas. Each group should write their ideas and solutions to deal with the dilemmas presented in their own boards.
Materials Provided	<p>PowerPoint presentation: structure of the practical activity – slide 18</p> <p>Board 01. Case of the researcher who painted rats</p> <p>Board 02. Case of the Lab Technician who spoke up</p> <p>Board 03. Case of the football fan student</p> <p>Board 04. Case of the ingenious student</p> <p>Set of post-its (distribute one per group)</p>
Classroom Setup and Guidelines	<p>Classroom setup:</p> <p>If the session is facilitated online, the teacher/facilitator should prepare 4 individual breakout rooms, prior to the session, to where each group should migrate to discuss their case (i.e. board). Students should first get acquainted with the structure of the activity, in the main online class, and then migrate to their individual breakout rooms.</p> <p>If the session is facilitated face-to-face, the teacher/facilitator should first present the students with the structure of the activity and then each group should discuss their case (i.e. board).</p>



	<p>Guidelines: the teacher/facilitator presents the structure of the practical activity outlined on slide 18:</p> <ul style="list-style-type: none"> • 4 groups of 5-6 students • Each group receives 1 board (the teacher/facilitator chooses 1 from the 4 boards available) and 1 set of post-its (if face-to-face session) • Each group watches the video mentioned in their individual boards (link and QR code in the boards) • Each group nominates a spokesperson to represent the group and to write their ideas and solutions on their boards • Each group discusses the two dilemmas and proposes solutions. The spokesperson writes it down using post-its or sticky notes (online session only!) • Each spokesperson presents their boards • Class discussion about the ideas and solutions presented by the spokespersons
Suggested Time	55 minutes
Learning Objective	Students should be capable of identifying the misconduct and questionable research practices outlined in the videos and be capable of relating such practices with their own school work actions, by discussing the dilemmas presented in their boards. Students should be capable of formulating their own ideas and discussing them, first in their group and then in a class discussion, to share their opinions and solutions to deal with the dilemmas presented in the 4 boards.



ACTIVITY: Part 3 – Conclusion/Wrap-up:



Activity Introduction for Students	Class discussion about the learning outcomes that resulted from the session and clarification of any remaining doubts/questions
Materials Provided	PowerPoint presentation
Classroom Setup and Guidelines	<p>The teacher/facilitator promotes a class discussion about the learning outcomes from the session. Students should demonstrate knowledge and be capable of explaining:</p> <p>Thematic (general) outcomes:</p> <p>What is animal experimentation? Why is animal welfare an important consideration? What are the key ethical issues? What are the steps involved in the research process?</p> <p>Main outcomes:</p> <p>What is research integrity and how does it apply to students' school work? What are research misconduct and questionable research practices, and how does it apply to students' school work? Why is it important to avoid engaging in such practices?</p>
Suggested Time	5 minutes