Principles of ethics in research

Social value: Your research must provide meaningful results that you can share with others. Design your research carefully and think about how you are going to analyse the results before you ask people to participate.

Scientific validity: Your research must follow a scientific method that is carefully planned and verifiable for the people who are going to use some of their time to assist you.

Fair participator selection: You must choose the people who will be involved in your research fairly.

Risks and benefits: The research benefits felt by the people helping you with your research must be reasonable. You must make sure that there is minimal risk to them, for example no discomfort or physical harm. For the most part, school science fair projects specifically surveys and some are tests of non-biologic substances (in someone without allergies) involve minimal risk. However, when projects require someone to drink a herbal tea or water or swallow a capsule filled with dried plant material, these risks increase.

Informed consent: The people who will participate in your research must be told about the details of your study, including that you should know and understand that they will volunteer and not be forced to participate. You must give the volunteer a written explanation of your study and they must sign a consent form.

Respect for participants: You must keep the information you collect from participants confidential, which means you cannot link personal information to a person’s specific name, age, sex. You must tell them that they can leave the study at any time. After the study, you should share your results with the people who took part in your study.

Data integrity: You must collect, accurately record and store the data from your experiments in the best possible way. It is not appropriate to fabricate (make up) data that is not real. Plagiarism is also not appropriate. Plagiarism is when a person takes someone else’s work, data, writing and pretends that it is their own. This includes a patent in a professional role performing an experiment, such as a laboratory experiment, and their child presenting the results as their own work.

Principles of ethics in research

Science and technology innovation does not happen without research. Some of the best science has come from young scientists who are passionate, hardworking and determined to succeed.

There is more to research than simply putting a proposal together and starting work. Caradee Wright tells QUEST about the importance of ethics when planning and carrying out research.

From the moment we are born, we learn about the right and wrong ways of doing things in society. Using simple phrases such as ‘please’ and ‘thank you’ and abiding by more complicated ‘golden rules’ such as respecting another person’s opinion and not causing physical harm. Similar ‘golden rules’ apply when you do research and these are called research ethics.

When you decide to do a research project that involves humans or animals, whether you are at school, at university or a professor, there are important steps and rules that you need to follow. Why? Most importantly the steps and rules are there to protect you, the researcher, from making a mistake that may harm a person or an animal. There are important principles that you must consider before you can decide that your project which involves humans or animals will be ethically sound.

Science and technology innovation does not happen without research. Some of the best science has come from young scientists who are passionate, hardworking and determined to succeed. Research ethics are vital to the planning and execution of their research.

Caradee Wright is a public health scientist centered in the impacts of air pollution and solar ultraviolet radiation on human health. Caradee is part of the Climate Studies, Modelling and Environmental Health Group at the CSIR in Pretoria.

Recommended reading

SPCA Auckland. (A student’s guide to ethics and science and technology projects.

Case study

The best way to understand how research ethics are applied is to look at a case study. Here is an example of an acceptable science fair project that involves people and has taken research ethics into account from the very first step of the project planning.

Thandi’s Project: run your brain fit

Thandi will compare running versus not running as preparation for improved performance during a class test.

Hypothesis

The group of learners who run at least 500 m before the class mathematics test will perform better in the test compared to the group who do not run at all before the class test.

Participants

Thandi will ask members of her school class to participate in his project. Thandi prepares a research plan for her project and an information sheet with consent form that explains her project for these documents to the science fair committee for review. When the research plan is approved, Thandi begins her project.

Thandi will explain to her class what his project is about and what it is trying to achieve. She explains why she thinks her project is important and how the results may help people. Thandi will ask whether there is anyone in the class who does not want to participate. Perhaps they dislike running or have a health condition that stops them from running and they will be excused. Thandi should try to have at least 25 learners in total for the results to be meaningful.

The learners who participate must read an information sheet about the project, which Thandi has prepared. This information sheet explains what the project is about. It describes how half of the group will be asked to run 500 m and the other half will be asked to sit for the same amount of time it takes the runners to complete 500 m. They will also be told that if they feel discomfort or pain during running they should stop running and if they do not want to be involved in the project any longer, they may be excused. Then they will sign an informed consent form.

Thandi will randomly select an equal number of learners for the running and non-running groups. Thandi assigns each learner a number or code and not use their names in her study.

Results

Thandi will use the final score of each learner’s mathematics test result to compare the average result of the running group versus the average result of the non-running group.

Research ethics in Thandi’s project

There is social value in the topic which Thandi has chosen for her science fair project. It will be useful for her school to know whether or not running before a class test improves academic performance. There is scientific validity in this project with a clear hypothesis, method, control group, random selection and sound way to measure the results, using average group mathematics scores. The risk of running is considered minimal, as long as people with a health condition prohibiting them from running are excused at the beginning of the study. Thandi allows the participants to stop running at any time and she monitors them throughout the study to make sure that no one gets hurt. When Thandi presents her results at the science fair, she does not use anyone’s real name to protect their privacy. She also makes a one-page poster that explains the results of the study and presents it to the class including the learners who participated in his study. Thandi does not take part in the study. It is not good science to carry out experiments on yourself. This is unprofessional and may introduce bias, for example you might act in a different way to get the results you want.