

# Course: Research Method in Software Engineering

## **WEEK 12-** Legal and Ethical Issues in Research

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# Week 12. Legal and Ethical Issues in Research

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# Learning Outcome

- Understand Ethics and its Importance in Research
- Understand the objectives of Research Ethics
- Explain the Principles and Components of Ethical Research
- Identify Legal Issues in Software Development
- Understand Software Engineering Code of Ethics

# 1. Introduction to Research Ethics

## Ethics in Research

- Research ethics is an essential aspect of scientific inquiry and helps maintain the integrity and credibility of research findings.
  - The principles refers the guidelines that govern the ethical conduct of research involving human participants or animals.
  - The principles are designed to ensure that research is conducted in a manner that respects the rights, dignity, and well-being of the individuals or animals involved.

[1]. Adda247, Research Ethics Meaning and Importance, July 17, 2024.  
<https://www.adda247.com/teaching-jobs-exam/research-ethics/>

# 1. Introduction to Research Ethics ... (cont'd)

## Why Research Ethics ?

- Research ethics is crucial for the following reasons:
  - **Scientific Integrity:** Research ethics upholds the integrity and validity of the research process.
  - **Compliance:** Ethical guidelines ensure compliance with legal and regulatory requirements.
  - **Ethical Decision-Making:** Ethics guides researchers in navigating complex ethical dilemmas.
  - **Collaboration & Reputation:** Ethical practices foster collaboration and enhance the reputation of researchers and institutions.
  - **Credibility & Trust:** Ethical practices enhance the credibility and trustworthiness of research findings.

## Objectives of Research Ethics

- A better grasp of research ethics can be achieved by understanding the objectives underlying its application. The primary goals of the research include:
  - 1. Protection of Participants:** Research ethics focuses on ensuring the well-being and rights of research participants through informed consent, risk minimization, and adequate safeguards.
  - 2. Scientific Integrity:** Research ethics upholds the integrity and validity of the research process by promoting unbiased data collection, analysis, and reporting, preventing fraud, and encouraging research reproducibility.
  - 3. Social Responsibility:** Research ethics also ensures that the research is carried out in a manner that benefits individuals or society as a whole.

## Ethical Issues in Research

- The issues related to research can be better understood through the following points:
  - **Validity:** Research methods should align with research questions and focus on the intended purpose.
  - **Sampling:** Samples should be logically justified, free from bias, and consistent with the research design.
  - **Confidentiality:** Participant identities and data should be kept confidential and protected.
  - **Vulnerable Groups:** Special care should be taken when involving sensitive groups in research

[1]. Adda247, Research Ethics Meaning and Importance, July 17, 2024.  
<https://www.adda247.com/teaching-jobs-exam/research-ethics/>

## Ethical Issues in Research ....(cont'd)

- **Beneficence and Non-maleficence:** Researchers are responsible for protecting participants and the public from unethical practices.
- **Informed Consent:** Participants should be fully informed about the research and its potential risks.
- **Plagiarism:** Researchers should not present someone else's work as their own or present their own work in multiple forms as unique.
- **Fabrication:** Manipulating or altering research outcomes is unethical.
- **Falsification:** Researchers should not manipulate research materials or omit data to misrepresent the research

## Components of ethical research

- **Integrity:** Researchers must uphold truthfulness and honesty in their findings and adhere to moral practices during the research process.
- **Objectivity:** Research work should have a well-defined and directional objective, ensuring a focused and unbiased approach.
- **Professional Competency:** Researchers should possess the necessary skills and expertise to handle, analyze, and interpret data accurately, ensuring the true nature of the research outcome.

## Components of ethical research ...(cont'd)

- **Confidentiality:** The anonymity of participants should be preserved and protected, ensuring their well-being and preventing any potential harm in the future.
- **Professional Behavior:** Researchers are expected to demonstrate professional conduct when interacting with participants, maintaining impartiality and avoiding biases in the research outcome.

[1]. Adda247, Research Ethics Meaning and Importance, July 17, 2024.  
<https://www.adda247.com/teaching-jobs-exam/research-ethics/>

## Principles of Ethical Research

- **Respect for Autonomy:** Researchers must respect the autonomy and rights of research participants, allowing them to make informed decisions regarding their participation in the study.
- **Beneficence:** Researchers should prioritize the well-being and welfare of participants, minimizing harm and maximizing benefits. They must strive to do good and avoid any unnecessary risks.
- **Justice:** Ethical research demands fairness and equity in participant selection, avoiding exploitation or discrimination. It involves considering the distribution of research burdens and benefits across different populations.

[1]. Adda247, Research Ethics Meaning and Importance, July 17, 2024.  
<https://www.adda247.com/teaching-jobs-exam/research-ethics/>

## Principles of Ethical Research ...(Cont'd)

- **Fidelity and Responsibility:** Researchers must recognize their duties and actively contribute their findings for the betterment of society as a whole.
- **Participant Recruitment:** The selection of participants should be based on a logical and justified approach, considering specific criteria for choosing one participant over others.

[1]. Adda247, Research Ethics Meaning and Importance, July 17, 2024.  
<https://www.adda247.com/teaching-jobs-exam/research-ethics/>

## 2. Software Engineering Code of Ethics

- Software engineering is constantly evolving, with new technologies emerging at a rapid pace. It is about writing code and creating solutions that positively impact society.
- Software engineers must understand and adhere to ethical standards in this fast-paced environment.
- A software engineering code of ethics is a moral compass, guiding professionals to make responsible decisions and ensuring that the products and services they develop align with societal values and expectations.
- Ethical considerations are crucial in this process, as they help software engineers navigate complex issues and make choices that prioritize the well-being of users and the broader community.

[2]. Institute of Data, The Essential Software Engineering Code of Ethics, November 13, 2023. <https://www.institutedata.com/blog/software-engineering-code-of-ethics/>

## The role of ethics in software development

- Ethics play a significant role in software development as they guide engineers in making choices that align with ethical principles.
- Software development involves various stages, including planning, designing, coding, testing, and maintenance.
- At each stage, ethical considerations should be considered to ensure that the software created is reliable secure and respects user privacy.

[2]. Institute of Data, The Essential Software Engineering Code of Ethics, November 13, 2023. <https://www.institutedata.com/blog/software-engineering-code-of-ethics/>

## a) The Code of Ethics during the planning phase

- During the planning phase, software engineers must consider the potential impact of their work on different stakeholders.
- They need to assess the ethical implications of the software's purpose and functionality, ensuring that it does not harm individuals or perpetuate discrimination.
- This requires a deep understanding of societal values and anticipating potential risks.

[2]. Institute of Data, The Essential Software Engineering Code of Ethics, November 13, 2023. <https://www.institutedata.com/blog/software-engineering-code-of-ethics/>

## 2. Software Engineering Code of Ethics ... (cont'd)

### b) The Code of Ethics during the design phase

- When designing the software, ethical considerations come into play regarding user experience and accessibility.
- Engineers must strive to create intuitive, inclusive interfaces and respect users' privacy.
- They should also consider the environmental impact of their designs, aiming for energy efficiency and sustainability.

[2]. Institute of Data, The Essential Software Engineering Code of Ethics, November 13, 2023. <https://www.institutedata.com/blog/software-engineering-code-of-ethics/>

# 2. Software Engineering Code of Ethics ... (cont'd)

## c) The Code of Ethics during the design phase .... (cont'd)

- The coding phase is where software engineers translate their designs into actual code.
- Ethical coding involves writing clean, well-documented code that is easy to maintain and understand.
- Engineers should also prioritise security measures, implementing robust authentication and encryption mechanisms to protect user data

[2]. Institute of Data, The Essential Software Engineering Code of Ethics, November 13, 2023. <https://www.institutedata.com/blog/software-engineering-code-of-ethics/>

## d) The Code of Ethics during the testing phase

- Engineers must thoroughly test the software for reliability, accuracy, and security.
- They should also consider the potential biases that may arise from the algorithms used in the software and take steps to mitigate them.

## e) The Code of Ethics when maintaining software

- Maintenance is an ongoing process in software development, and ethical considerations should continue to be prioritized.
- Engineers must respond to user feedback and promptly address any issues or vulnerabilities.
- They should also stay current with emerging ethical standards and adapt their software accordingly.

# 2. Software Engineering Code of Ethics ... (cont'd)

## Key principles of the software engineering code of ethics

- The software engineering code of ethics establishes guiding principles to help professionals make ethical decisions. These principles encompass **responsibility, accountability, fairness, and justice.**

### a) Responsibility and accountability in software engineering

- Software engineers must ensure their software is reliable, safe, and meets users' needs.
- They must also be accountable for the consequences of their actions and decisions. This includes addressing and rectifying any issues or vulnerabilities that may arise in the software.

[2]. Institute of Data, The Essential Software Engineering Code of Ethics, November 13, 2023. <https://www.institutedata.com/blog/software-engineering-code-of-ethics/>

# 2. Software Engineering Code of Ethics

...(cont'd)

## Key principles of the software engineering code of ethics

...cont'd

### b) Fairness and justice in software engineering practices

- Software engineers should strive to create inclusive and accessible software that does not discriminate against individuals based on race, gender, age, or disability.
- They should also ensure that the software they develop adheres to legal and ethical standards, promoting fairness and justice in their work.

[2]. Institute of Data, The Essential Software Engineering Code of Ethics, November 13, 2023. <https://www.institutedata.com/blog/software-engineering-code-of-ethics/>

# 3. Legal Issues in Software Development

- The software industry attaches great importance to legal issues in software development because it understands that the highest data protection standards must carry out proper app development.
  - Failure to do so results in legal risks and poses a threat to the personal assets of both the app creator and the users.
- Therefore, when creating a mobile application, website, or even a simple program, we should consider key legal considerations to ensure the appropriate level of protection.
- Not only the product's success but also a company's existence will depend on it.

[3]. mDevelopers, Legal Issues in Software Development, Milo Miszewski, April 4, 2023. <https://mdevelopers.com/blog/legal-issues-in-software-development>

**The Crucial Legal Issues for software developers, customers, and users.**

## **a) Jurisdiction & Jurisdiction Conflicts**

- If we are launching a product (e.g., a mobile application) internationally, we must ensure that the product complies with local laws. It is worth asking for help from a lawyer specializing in such matters.
  - It allows to avoid misunderstandings about the laws of the countries where the product will be released.
- Therefore, all legal aspects should be checked before and, as any legal or jurisdictional conflicts are time-consuming and costly and often prevent the product from being launched on the market.

# 3. Legal Issues in Software Development

...(cont'd)

The Crucial Legal Issues for software developers, customers, and users. ...cont'd

## b) Confidentiality Agreement

- Confidentiality agreements should be one of the first documents signed by the software development company and third-party software even before present the product idea.
- The point is not to expose idea to theft or fall into the hands of competitors.
- A Non-Disclosure Agreement (NDA) is considered the best-known way to protect a product and maintain confidentiality. A Non-Disclosure Agreement (NDA) is a legally binding contract that establishes a confidential relationship between two or more parties.

[3]. mDevelopers, Legal Issues in Software Development, Milo Miszewski, April 4, 2023. <https://mdevelopers.com/blog/legal-issues-in-software-development>

# 3. Legal Issues in Software Development ... (cont'd)

The Crucial Legal Issues for software developers, customers, and users. ....cont'd

## c) Intellectual Property Rights

- To ensure that a company has exclusive ownership of the content, design, and source code, there are three techniques to assign intellectual property rights and secure the application idea - trademarks, copyrights, and patents.
- It ensures that no one else will own or benefit from any aspect of our product.
- Copyright can protect the app's source code, design, and content. In addition, it may be protected as a trade secret. Register its name, brands, and logos to ensure product safety.

[3]. mDevelopers, Legal Issues in Software Development, Milo Miszewski, April 4, 2023. <https://mdevelopers.com/blog/legal-issues-in-software-development>

The Crucial Legal Issues for software developers, customers, and users. ....cont'd

## d) Contract

- The contract is essential because it describes the development services we expect from our partner.
- A well-constructed contract defines the scope of responsibility in the event of a dispute and prevents unpleasant surprises.
- A good contract should contain several details, such as a confidentiality clause, code ownership issues, terms of use of open-source software, and guarantees and obligations.

[3]. mDevelopers, Legal Issues in Software Development, Milo Miszewski, April 4, 2023. <https://mdevelopers.com/blog/legal-issues-in-software-development>

# 3. Legal Issues in Software Development ... (cont'd)

The Crucial Legal Issues for software developers, customers, and users. ....cont'd

## d) Privacy Policy

- If once product collects user data, he must be transparent about the information collected and its purpose. Must ensure that one include a privacy policy to protect users' personal information from malicious activities, thereby securing it and building user trust.
- Take the time to ensure that a mobile app or other digital product complies with international and local data protection laws and regulations, such as the European Union's General Data Protection Regulation. Paying attention to the guidelines is essential for the business to stay on top of current standards.
- If once product is aimed at children, remember that different regulations protect children's rights and privacy

# 3. Legal Issues in Software Development ... (cont'd)

The Crucial Legal Issues for software developers, customers, and users. ....cont'd

## e) Publishing the Application in App Stores

- If we want to put our app in the **app stores**, we must meet many conditions that these stores require.
- App stores mainly protect their activities and do not take responsibility for applications that do not fully have legal issues. Therefore, before we place an application in any app store, ensure we have carefully established the rules that users must accept and follow to download and use the mobile application.
- If advertisements appear in our application, they must also comply with the legal regulations applicable to the given country.

[3]. mDevelopers, Legal Issues in Software Development, Milo Miszewski, April 4, 2023. <https://mdevelopers.com/blog/legal-issues-in-software-development>

**The Crucial Legal Issues for software developers, customers, and users. ....cont'd**

## **f) Limit Your Liability**

- Legal issues are often highly complicated, and without the help of a lawyer, it is often impossible to develop an appropriate solution that will benefit both our company and users.
- Professional legal assistance in this matter is essential for every company, regardless of whether we are talking about early-stage startups or large companies with many years of experience.
- One must be aware that his responsibility level varies depending on the company's legal status.
- This will help to maintain an appropriate level of responsibility.

[3]. mDevelopers, Legal Issues in Software Development, Milo Miszewski, April 4, 2023. <https://mdevelopers.com/blog/legal-issues-in-software-development>

# Summary

- Research ethics is an essential aspect of scientific inquiry and helps maintain the integrity and credibility of research findings
- Software development is a big challenge that requires appropriate knowledge and experience. For this reason, it should be run by an experienced software development company.
- It is worth realizing that legal issues during software development are as important as the proper functionality of the product or its timely delivery.
- The software industry attaches great importance to legal issues in software development because it understands that the highest data protection standards must carry out proper app development.
- Some claim that legal issues are even more important because not only the application's success but also the entire company's existence depends on the proper protection of users' interests.

# References

1. Adda247, Research Ethics Meaning and Importance, July 17, 2024.

<https://www.adda247.com/teaching-jobs-exam/research-ethics/>

2. Institute of Data, The Essential Software Engineering Code of Ethics, November 13, 2023.

<https://www.institutedata.com/blog/software-engineering-code-of-ethics.>

3. mDevelopers, Legal Issues in Software Development, Milo Miszewski, April 4,

2023. <https://mdevelopers.com/blog/legal-issues-in-software-development>

# Thank You!