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Ethical and Deontological Concerns

Introduction

Our team has considered these values throughout the Bloem project. The analysis is based on general engineering ethics frameworks, such as those defined by the IEEE Code of Ethics, which emphasize safety, honesty, sustainability and responsibility towards society **[1]**.

The analysis covers five essential areas:

- Professional responsibility in engineering
- Integrity in sales and marketing
- Environmental impact
- Legal liability
- Ethical design decisions

These principles act as guiding values for responsible engineering. By addressing these aspects, we ensure that our solution is not only functional and innovative, but also respectful of societal values, sustainable development and human wellbeing.

Engineering Ethics

The team is committed to respecting core engineering ethics such as honesty, accuracy and prioritization of user safety. During the development of Bloem, all technical decisions are made with consideration of safety, comfort and reliability.

Engineers have a professional and moral responsibility to protect public health, safety and welfare. This is especially important for Bloem, as it is an enclosed space where users seek relaxation. Therefore, specific risks must be considered and minimized. These include:

- Insufficient ventilation leading to poor air quality or CO_2 buildup
- Electrical failure of lighting or sound systems
- Excessive sound isolation reducing awareness of external emergencies
- User discomfort or panic in an enclosed environment

The team addresses these risks through design decisions such as ensuring proper airflow, using safe low-voltage systems and creating an intuitive and easy-to-exit structure.

Engineering ethics also requires transparency and accountability. Any claims about the benefits of Bloem, such as stress reduction, must be realistic and based on existing research.

The team applied these principles by:

- Designing a safe and accessible enclosed structure
- Selecting non-toxic and sustainable materials
- Ensuring proper ventilation and user comfort
- Creating an intuitive user experience without the need for instructions

This ensures that the final design is safe, responsible and aligned with professional engineering

standards.

Sales and Marketing Ethics

In Bloem’s marketing and communication, the team aims to provide clear, honest and transparent information about the product. The capsule is designed to support relaxation and short mental breaks, but it should not be presented as a medical solution or a guaranteed treatment for mental health issues.

Ethical marketing includes:

- Honest communication without exaggerated claims
- Transparency about limitations and realistic benefits
- Use of reliable and research-based information
- Respect for user privacy and informed decision-making

Marketing efforts should clearly explain what the product offers: a quiet, enclosed space that supports relaxation in busy environments.

In addition, inclusivity is important. Bloem is designed for a wide range of users, so communication should reflect accessibility and not target only a specific group. This approach helps build trust and ensures compliance with consumer protection standards.

Environmental Ethics

Bloem is designed with sustainability as a core principle. The use of natural materials such as cork and hemp reduces environmental impact while also improving acoustic performance.

The project supports environmental responsibility through:

- Use of renewable and sustainable materials
    - Reduction of synthetic and non-recyclable components
    - Design for durability and long product lifespan
    - Possibility for repair and replacement of components

  In addition, responsible sourcing of materials is considered to ensure minimal environmental harm during production. The design also aims to fit naturally within office environments without being visually or physically disruptive.

At the end of its lifecycle, materials should be recyclable or biodegradable where possible. These decisions align with broader European sustainability goals and contribute to more responsible product design.(European Commission, 2019)

Liability

As future engineers, the team understands the importance of liability and accountability for design decisions. Since Bloem is a physical product that users enter, safety and compliance are critical.

Possible risks include:

- Poor ventilation inside the capsule
- Electrical malfunction of lighting or sound systems
- Structural instability or material failure
- User misuse due to unclear instructions

The team addresses liability through:

- Risk identification during the design phase
- Clear user guidance and intuitive design
- Safe material and component selection
- Regular testing and validation of the system

From a legal perspective, the product must comply with relevant European regulations, such as:

- Low Voltage Directive (2014/35/EU) ensuring electrical safety of lighting and electronics **[2]**
- EMC Directive (2014/30/EU) preventing electromagnetic interference between components **[3]**
- General Product Safety Directive (2001/95/EC) ensuring overall product safety **[4]**
- Machinery Directive (2006/42/EC) if moving or mechanical parts are included **[5]**

Compliance with these directives is necessary for CE marking and allows the product to be legally introduced to the European market. If digital features are included, data protection must also be considered. Only necessary data should be collected and users must be informed transparently about its use. By addressing these aspects, the team reduces risks and ensures accountability for the final product. **[6]**

Summary

Ethical and deontological considerations play an important role in the development of Bloem. The project integrates principles of safety, transparency, sustainability and responsibility into every stage of the design process.

Engineering ethics ensures that user wellbeing remains the top priority, while ethical marketing guarantees honest communication. Environmental considerations reduce the impact of the product and liability ensures safety and legal compliance.

By combining these aspects, Bloem represents a responsible and human-centered engineering solution that aligns with both professional standards and societal needs.

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[2] European Comission, 2016. *Low Voltage Directive (LVD).*
[3] European Comission, 2018. *Guide for the EMCD (Directive 2014/30/EU.*
[4] European Agency for safety, health at work, 2023. *Directive 2001/95 EC - product safety.*
[5] European Agency for safety, health at work, 2006. *Directive 2006/42/EC - machinery directive.*
[6] EUR-LEX

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Last update: **2026/05/02 20:50**