

# Machine Learning for Everyone: Exploring Diverse Pedagogical Approaches for Non-CS Students.

## Background

Machine learning is becoming a vital skill in diverse domains, however, teaching it to students from other disciplines can be challenging, this research explores how educators are addressing these challenges and finding creative ways to make machine learning both accessible and engaging for everyone.

## Objectives

1. Identify effective teaching strategies
2. Explore the challenges faced by students and instructors.
3. Provide actionable recommendations.

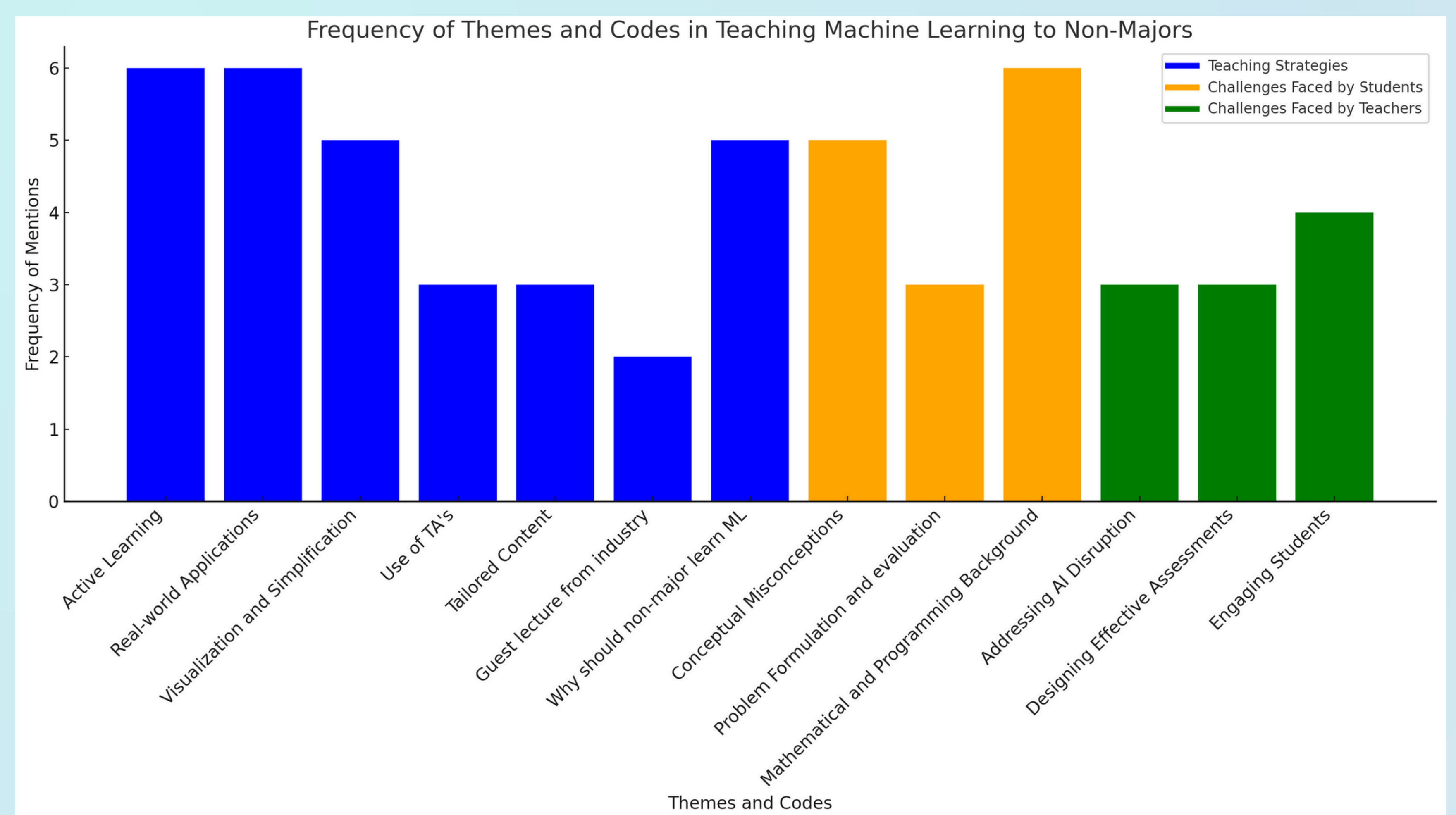
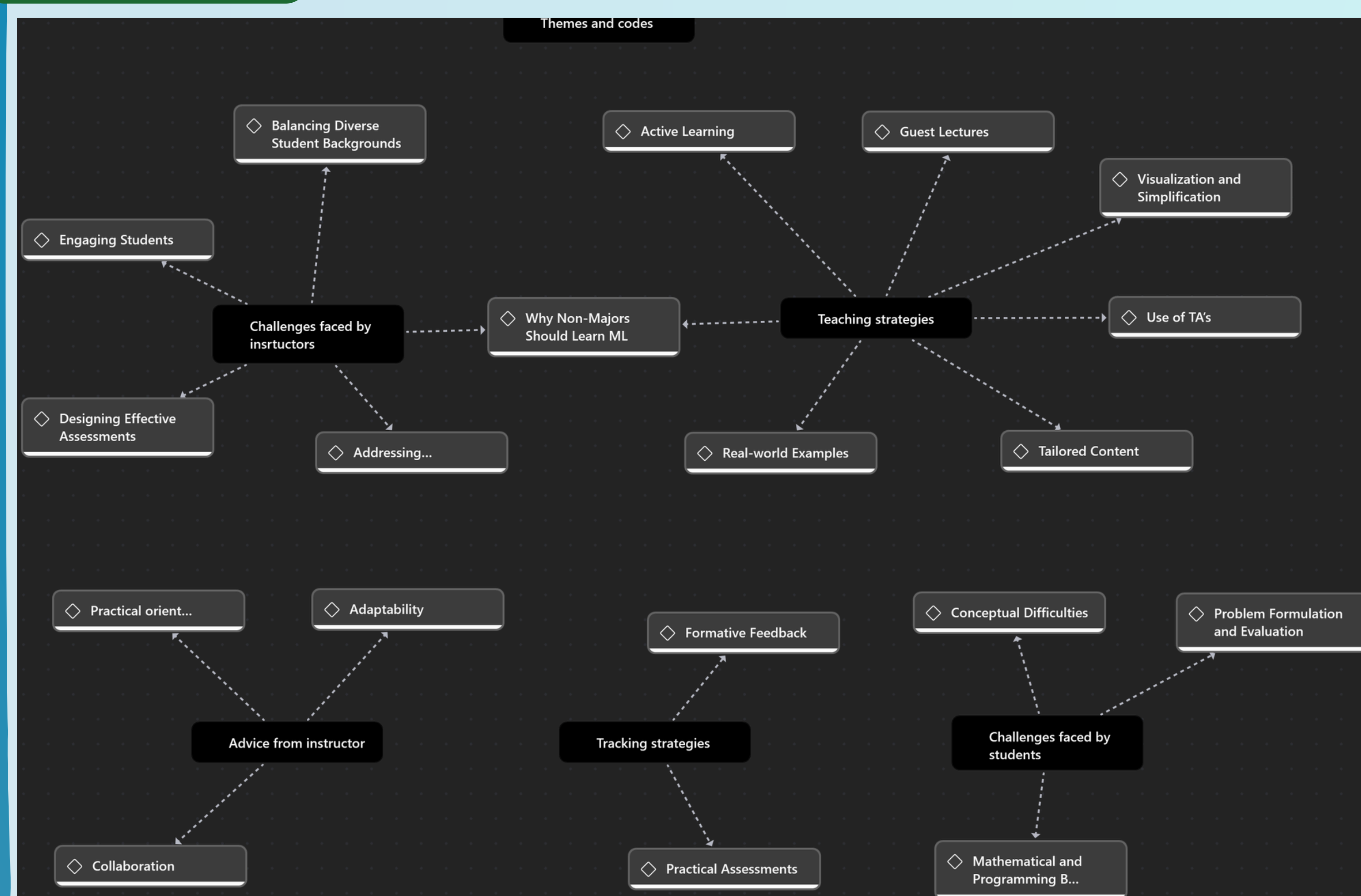
## Research questions

1. What pedagogical strategies do instructors use to teach machine learning concepts, simplify complex topics, and track student progress and understanding?
2. What challenges do non-majors face when learning machine learning, and how do these challenges impact their engagement and understanding?
3. What challenges do instructors face when teaching machine learning to non-majors, and how do they address these challenges?
4. What actionable advice can be drawn from instructors' experiences to guide educators in designing and delivering effective ML courses for non-majors?

## Methodology

- Conducted semi-structured interviews with six ML instructors from different disciplines at TU Delft.
- Focused on teaching strategies, student/instructor challenges, progress tracking, and capturing instructor's advice.
- A list of ML courses at TU Delft was created, and purposeful sampling was applied to select instructors, ensuring diverse perspectives across disciplines and teaching levels.
- Applied thematic analysis with ATLAS.ti to identify key patterns and themes.
- Followed ethical guidelines, including informed consent and data anonymization.

## Results



## Discussion: Implications for Educators

1. Tailoring Content: Adapt course material to students' backgrounds using discipline-specific examples and projects.
2. Real-world Applications and Visualization: Simplify concepts through real-world examples, accessible datasets, and visual tools.
3. Active Learning: Use hands-on projects and collaborative activities to promote deeper engagement.
4. Innovative Assessment Methods: Employ project-based and in-class assessments to ensure authentic learning in the age of AI tools.
5. Support for Diverse Backgrounds: Offer preparatory resources and personalized guidance to address varying skill levels.

## Limitations → Future work

- Limited sample size → Include a larger and diverse group of instructors.
- TU Delft-specific findings → Explore other institutions for broader insights.
- Missing student's perspectives → Incorporate student experiences.
- Limited exploration of AI tools → Study AI tool integration in teaching and assessments.

## Conclusion

- Tailored teaching strategies, real-world applications, and active learning enhance machine learning education for non-CS students.
- Practical methods and interdisciplinary collaboration are the key to improve accessibility and engagement.