

# INNOVATIVE PEDAGOGIES FOR SUSTAINABLE MINDSET FORMATION IN HIGHER EDUCATION: THE METHOD–COMPETENCY–MINDSET MODEL

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## INTRODUCTION

### Relevance

The growing complexity of global social, economic, and environmental challenges highlights the need for higher education to move beyond traditional knowledge transmission. Universities play a critical role in preparing graduates capable of systemic thinking, ethical decision-making, and responsibility for long-term societal impacts. Innovative pedagogies are increasingly viewed as essential tools for fostering sustainability-oriented competencies and mindsets.

### Research problem

How innovative teaching and learning methods contribute to the formation of sustainability-related competencies and a sustainability mindset in higher education?

### Aim

To conceptualize a framework connecting innovative learning methods with the formation of

sustainability-related competencies and worldviews.

### Tasks

To analyze theoretical foundations of Education for Sustainable Development, sustainability competencies, and transformative learning;  
to identify innovative pedagogical approaches relevant to sustainability-oriented education;  
to develop a conceptual model linking methods, competencies, and mindset formation;  
to discuss the implications of the model for higher education and regional development.

### Research methodology

The research applied a theoretical approach, including a systematic review and thematic analysis of scholarly literature on Education for Sustainable Development, transformative learning, and sustainability pedagogy.

## Theoretical assumptions

### Education for Sustainable Development (ESD)

Higher education is expected to develop not only knowledge but also values, attitudes, and action competence for sustainability. ESD emphasises interdisciplinarity, student-centred learning, and real-world engagement (Cai & Wolff, 2022; Vilimala et al., 2022).

### Sustainability competencies

Core competencies include systems thinking, critical reflection, collaboration, ethical reasoning, and civic responsibility. These competencies enable learners to understand socio-ecological complexity and co-create solutions (Bucea-Manea-Țoniș et al., 2024; Mokski et al., 2023).

### Transformative and active learning

Deep shifts in learners’ perspectives occur when cognitive, behavioural, and affective dimensions are activated through experiential, reflective, and participatory pedagogies such as flipped learning, gamification, challenge-based learning, living labs, XR, and AI-enhanced environments (Manzano-León et al., 2021; Thoriq & Mahmudah, 2023; Stracke et al., 2025; Alamäki et al., 2024).

### Sustainability mindset

When sustainability competencies are repeatedly practised in meaningful contexts, they gradually consolidate into a sustainability-oriented mindset characterised by responsibility for impact, long-term orientation, and systemic awareness (Kassel et al., 2016; Tran, 2024; Cripps & Smith, 2024).

## CONCLUSIONS AND RECOMMENDATIONS

**Innovative pedagogies** can support the formation of sustainability-oriented human capital in higher education.

**The Method–Competency–Mindset (MCM) model** provides an integrative framework that explains how learning methods trigger competency development, which over time can lead to a sustainability-oriented mindset.

**Higher education** should be seen not only as professional preparation, but as a strategic driver of responsible societal transformation.

**Students** who internalise sustainability values and ethical responsibility are more likely to apply these principles in organisational decision-making, contributing to more responsible business models and stakeholder relations. At the same time, they transfer sustainability practices into their personal, civic, and community roles—acting as informed citizens, responsible consumers, family members, and community leaders.

**Over the long term**, such graduates may return as mentors, educators, and researchers, reinforcing a culture of responsibility and sustainability across generations.

*The MCM model can be viewed as a conceptual enhancement of existing frameworks of university–community collaboration, helping to align pedagogical practices with broader societal and regional development goals. By advancing pedagogies that engage cognitive, behavioural, and affective dimensions of learning, universities strengthen their position as catalysts of sustainable regional development.*

## Research results

### A conceptual Method–Competency–Mindset (MCM) model was developed.

The model synthesises insights from ESD, sustainability competencies, and transformative learning literature to explain how innovative pedagogies contribute to sustainability mindset formation.

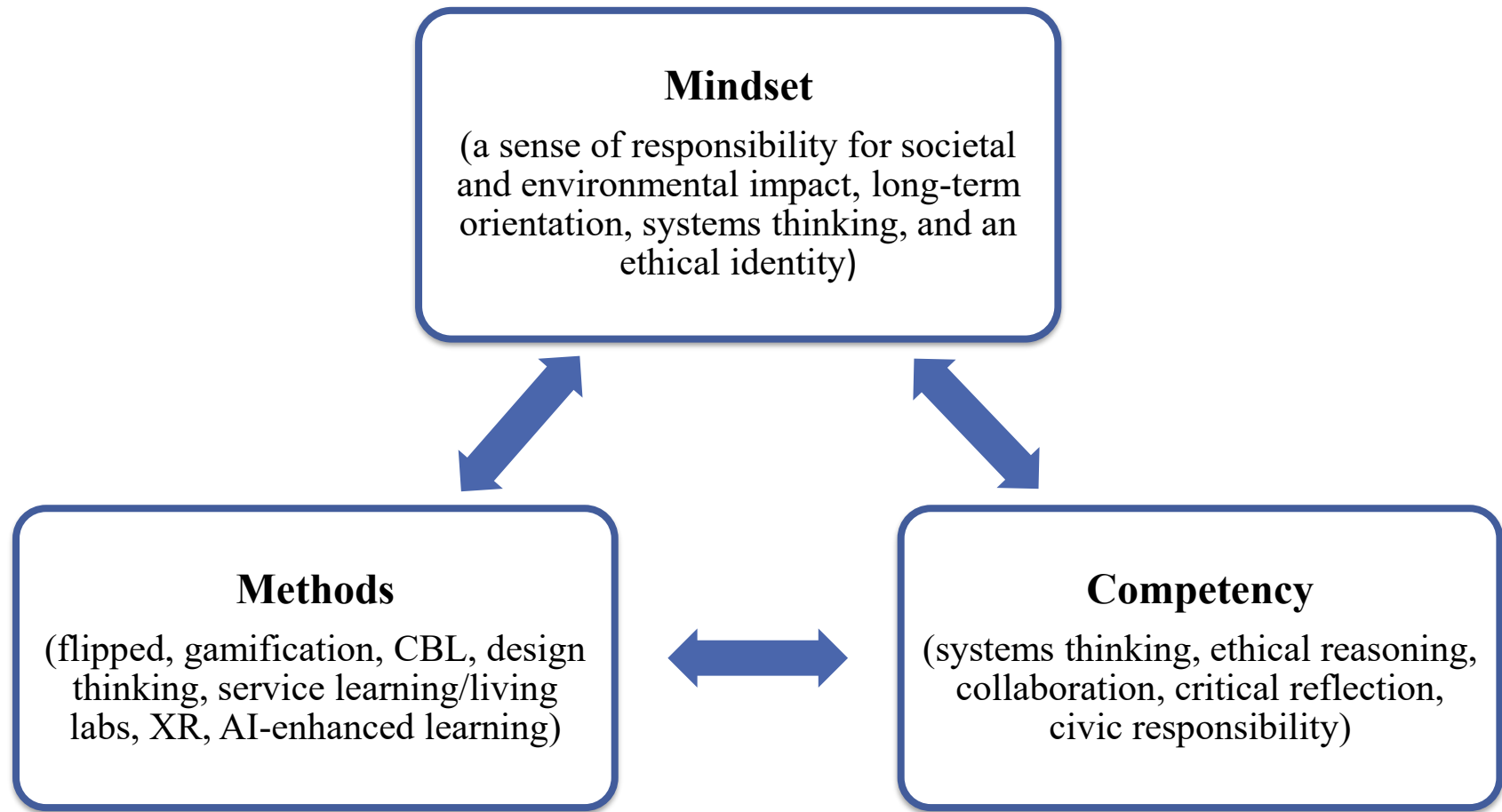


Figure 1. The Method–Competency–Mindset (MCM) Triangle  
Source: Authors' own elaboration based on literature review

### Innovative learning methods trigger competence development.

Methods such as flipped learning, gamification, challenge-based learning, design thinking, service learning/living labs, XR, and AI-enhanced learning activate cognitive, behavioural, and affective dimensions of learning.

### Competencies evolve into sustainability-oriented mindsets.

Repeated practice of systems thinking, ethical reasoning, collaboration, and critical reflection supports the gradual internalisation of sustainability values and long-term, responsibility-focused worldviews.

### The MCM model highlights a dynamic, iterative process.

Pedagogical methods → foster competencies → which, over time, consolidate into a mindset. A feedback loop suggests that a developed mindset further strengthens learner engagement and ethical decision-making.

### The model positions higher education as a driver of societal change.

Sustainability-oriented graduates can influence organisational behaviour, support responsible decision-making, and contribute to community and regional development.

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