



early years' science education in-service education critical thinking creative thinking

Science teachers' in-service education to enhance students' **Critical and Creative Thinking**

In-service education programme to prepare and qualify science teachers to respond to the difficult task of promoting students' critical and creative thinking (CCT)

**Vital for students:**

- to face future challenges
- to create innovative solutions
- to become responsible citizens

OECD (2018)

**Why?**

- Critical Thinking is neither natural nor spontaneous
- Creative Thinking has been decreasing significantly
- Science Education (SE) is a privileged context to foster CCT
- Teaching strategies used in SE enhance little CCT development
- Teachers need specific preparation to effectively promote CCT

Hodson (2009)  
Kim (2011)  
Mansour (2013)  
Runco (2007)  
Tenreiro-Vieira & Vieira (2019)  
Van Gelder (2005)

**How?**

- respecting and responding to teachers needs
- providing confrontation between practices and guidelines
- encouraging reflection on conceptions and didactic practices
- disseminating strategies that promote students' CCT
- fostering open discussion, collaboration and collegiality
- placing CCT at the heart of the teaching/learning process



Strengthen CCT

Classroom culture

Conceptual clarification

Formative Content

**EXPECTED RESULTS**

Teachers

- recognize CCT importance on students' learning and overall formation
- understand their role and the professional skills needed to promote CCT in Science classrooms
- integrate systematic teaching strategies oriented to effectively promote and assess CCT

Students

- construct significant scientific knowledge
- improve learning outcomes
- develop CCT
- become better prepared for a responsible, active and democratic citizenship

References

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