

## Master Thesis Proposal

*„Promoting Critical Thinking and Collaborative Problem-solving in Higher Education: A systematic literature review using the PRISMA statement. “*

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### 1 Problem Statement

According to research on people selection and career development, companies value employees with strong transferrable skills (Fugate et al., 2004). Even though definitions vary, there is consensus that transferable skills refer to an individual's practical ability to act effectively in a variety of real-life situations (Nägele & Stalder, 2017). Critical thinking (CT) and collaborative problem-solving (CPS) are considered two of the most important transferable skills both for education and for the workplace (Graesser et al., 2018). In short, students and professionals with the ability to think critically and work collaboratively can address a problem, interpret, and decide the importance of the content (Rodzalan & Saat, 2015). Previous research has indicated various teaching practices that foster CT and CPS as transferable skills in higher education. Therefore, a systematic literature review is in need for researchers, employers, and stakeholders to have a clear overview of the current practices.

### 2 Research Objective and Research Questions

The current thesis is a systematic literature review on teaching practices that foster CT and CPS in higher education, with a special focus on STEM, vocational, and technical topics. The research question to be addressed is the following:

*What teaching methods are used in higher education and specifically in the STEM, technical, and vocational fields, that foster critical thinking and collaborative problem-solving skills?*

### 3 Theoretical Framework

Globalization, technological advancement, and demographic change have profoundly altered the structure of employment. Higher-level skills will become more in demand (OECD, 2017) and CT and CPS will play important role in the future. Critical thinking is "the type of thinking involved in problem-solving, making inferences, calculating probabilities, and making decisions" (Halpern, 1999, p. 70). CPS is having adequate cognitive problem-solving and social collaboration skills (Graesser et al., 2018). Research suggests that both constructs are determinants of the successful use of new technologies and innovation in business and education in the future and to address 21st-century complex problems. Solving a complex problem requires the ability to analyze, interpret, evaluate, summarize, and synthesize all information, and apply the results to find solutions collaboratively (Trilling & Fadel, 2009). Therefore, CT and CPS skills are interdependent, as each skill set supports the other in the pursuit of solving complex problems in

a collaborative setting. Previous work on the topic of CPS suggests that working collaboratively leads to greater individual and collective knowledge growth, better levels of confidence and motivation, and improved social interactions and feelings toward other students (Laal & Ghodsi, 2011).

#### 4 Research Method and Design

This study is a systematic literature review. Systematic literature reviews allow policymakers, stakeholders, and researchers to reach out to trustworthy and applicable review findings (Page et al., 2021). The current Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA) is a published statement to facilitate transparent and complete reporting of systematic reviews. Firstly, identification, screening, and eligibility of systematic review techniques will be used. Afterwards, the data will be extracted and examined at the end of the process. The keywords of critical thinking skills, problem-solving skills, teaching, and higher education will be used in ERIC, SCOPUS, ScienceDirect, and Google Scholar databases. The inclusion criteria of the review are

<b><i>Inclusion Criteria for Systematic Review</i></b>	
Empirical Research	(Experimental, quasi-experimental, observational, evaluation, qualitative, mixed method)
Education Level	Higher education (Bachelor, Master, Doctorate students)
Programs	STEM related programmes; Vocational Education; Technical Education
Country	Worldwide
Type of Selected Research	Journal article, conference papers
Language	English
Field	STEM; Vocational Education; Technical Education
Database	ERIC, Scopus, Science Direct, Google Scholar
Publishing Year	2012-2022

The results will provide a systematic categorization of all the teaching methods and interventions implemented to foster CT and CPS among higher education students in STEM programs effectively and the type of educational practices that makes a meaningful difference in students' CT and CPS skills.

## 5 References

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