

AI for Evaluating, Classifying, and Generating Computational Thinking (with focus on Bebras) Tasks

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1 Introduction

My research focuses on the application of artificial intelligence (AI) to improve Computational Thinking (CT) tasks, which are designed inspired by Bebras competition to introduce CT concepts to K-12 students. The aim is to use AI to evaluate, classify, and generate these tasks to enhance their pedagogical value and better assess the difficulty levels. This research fits within the broader fields of informatics and computer science education, with a particular focus on assessment, computational thinking, and educational technology.

2 Research Question:

The central question guiding my PhD is: How can AI-driven methods be used to evaluate and classify CT tasks, and how effective are these methods in aligning with expert evaluations and student outcomes? The research also explores the use of AI in generating new tasks and assessing how well these tasks align with human-designed criteria and pedagogical goals.

3 Methodology

To address this question, I will use a mixed-methods approach:

Survey and Expert Feedback Gather expert opinions on AI-derived criteria for evaluating Bebras tasks.

AI-based Task Evaluation Use machine learning models, such as large language models (LLMs), to automatically assess the difficulty and quality of Bebras tasks and compare these evaluations to human expert ratings and student performance data.

Classification Models Develop AI-based classification systems to categorize tasks based on computational thinking (CT) concepts.

Task Generation Research AI-based Generative systems for Bebras Tasks and computational thinking (CT) concepts.

4 Related Work

Several works address the use of AI in education, specifically in evaluating and generating learning materials. For example, research in automated grading systems and AI-based educational tools has shown promise in improving task design and evaluation [3]. Notably, LLMs like GPT have been explored for generating educational content[2], and computational thinking tasks have been studied extensively in CS education literature. My work aims to bridge these areas by applying AI to Bebras tasks, a unique and globally recognized assessment framework.

5 Publications

5.1 I have

- One journal paper in Discover Education about cultural and gender-based differences for the technological tools of the education of CS in Discover Education in 2024 [1]
- One conference paper about students views on AI, positive and negative (Accepted in ICETC 2024-Porto)

5.2 I aim for

- Conference: ITiCSE 2025 (30 June-2 July, Netherlands)
- Journal: Informatics in education
- Conference: Koli Calling 2025 (November, Finland)
- Journal: Computers and Education Open: AI
- Conference: AIED 2026

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