

TOPIC
TeachBench: Designing AI-Mediated Intelligent Tutor Creation Tools for Educators
SUPERVISORS
Luigi De Russis (luigi.derussis@polito.it) Tommaso Calò (tommaso.calo@polito.it)
KEYWORDS
Human-Computer Interaction, Intelligent Tutoring Systems, AI-Assisted Development, Educational Technology, Teacher Empowerment, End-User Development
CONTEXT
<p>The potential of AI to revolutionize user interface development is significant, with recent advances enabling natural language-based creation of complex interfaces. In educational technology, Intelligent Tutoring Systems (ITSs) [1] offer promising opportunities for personalized learning, yet creating these systems remains challenging for educators who lack technical expertise [2]. While existing authoring tools attempt to address this gap, they often result in rigid interfaces or require significant technical knowledge, limiting their practical adoption.</p> <p>This thesis sets out to explore how AI-mediated interfaces can support educators in creating intelligent tutors through natural language interaction and visual editing. By focusing on the usability aspects of AI-assisted development, we aim to understand how educators interact with and understand these novel creation tools [3]. This research will contribute to the broader understanding of how to design intuitive interfaces for AI-assisted content creation tools.</p> <p>— — — — —</p> <p>[1] Arthur C Graesser, Mark W Conley, and Andrew Olney. 2012. Intelligent tutoring systems. (2012).</p> <p>[2] Tommaso Calo and Christopher Maclellan. 2024. Towards Educator-Driven Tutor Authoring: Generative AI Approaches for Creating Intelligent Tutor Interfaces. In Proceedings of the Eleventh ACM Conference on Learning @ Scale (L@S '24). Association for Computing Machinery, New York, NY, USA, 305–309. https://doi.org/10.1145/3657604.3664694</p> <p>[3] Lane Lawley and Christopher Maclellan. 2024. VAL: Interactive Task Learning with GPT Dialog Parsing. In Proceedings of the CHI Conference on Human Factors in Computing Systems. 1–18.</p>
GOAL
The thesis will aim to:

1. Design and develop a prototype of TeachBench that allows educators to:
 - Create basic intelligent tutors through natural language interaction
 - Customize AI-generated tutor interfaces through visual editing
 - Preview tutors before deployment
2. Evaluate the usability of TeachBench with educators, including:
 - Think-aloud sessions with educators to identify interaction barriers
 - Task-based user studies comparing different interface approaches
 - Semi-structured interviews to understand educators' mental models
3. Provide design recommendations for:
 - Natural language interfaces for tutor creation
 - Visual editing tools for AI-generated tutors
 - Interface elements that support educator understanding and control

METHODOLOGY

The methodology will include:

- Literature Review: Analyzing existing research on AI-assisted interface creation tools and natural language interaction patterns
- Design and Prototyping: Developing a prototype interface that combines natural language input with visual editing capabilities
- Usability Studies: Conducting think-aloud sessions and task-based evaluations with educators
- Analysis: Deriving usability insights and design recommendations from the collected data

PROFILE (e.g. rather theoretical/rather practical implementation, foreknowledge (courses, methods, computer language(s) etc.))

Literature and interface analysis – 25%

Prototype development – 50%

Usability testing and analysis – 25%

Required skills:

Experience with web development (JavaScript, React)

Knowledge of UI/UX design principles

Familiarity with usability testing methods

Basic understanding of AI/ML concepts

Interest in educational technology