Towards Characterizing Trust in Generative Artificial Intelligence among Students

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CCS CONCEPTS

• **Human-centered computing** → **Human computer interaction (HCI)**; • **Social and professional topics** → **Computing education**; • **Computing methodologies** → Artificial intelligence.

KEYWORDS

Generative AI, Trust, Novice programmers

1 INTRODUCTION

Artificial Intelligence (AI) plays a significant role in computing education (CSEd), such as helping students in programming courses [6]. Recent advancements in Generative AI (GenAI), such as ChatGPT, further affect CSEd [1]: studies show promising results [5] as well as the need for newer pedagogy [2]. Here, we explore one under-explored dimension of GenAI in education, namely *trust*.

Trust is fundamental in human-AI interaction, especially in how humans depend on AI for problem-solving [3]. In this work, we aim to characterize the relation between students' trust in GenAI, motivation in CS and programming self-confidence via questions:

RQ1: How extensively do students use GenAI and what are their perceived benefits and drawbacks?

RQ2: How much do students trust GenAI tools?

RQ3: Overall, how do students perceive AI tools for programming (positive/negative, etc.)?

2 METHODOLOGY

We conducted an exploratory survey with undergraduate and graduate students at a large US public university. Students from two CS courses were invited to fill out an anonymous online survey. We received 130 responses: 103 male and 27 female, with 121 CS and 9 non-CS majors. The survey included open and close-ended questions, covering demographics, participants' confidence in programming, trust in AI (based on [4]) and their experiences and opinions about using AI tools. An example Likert question was: *Based on your experience using AI tools, how much do you agree or disagree with the statement "The output the system produces is as good as that which a highly competent person could produce".*

3 PRELIMINARY FINDINGS

RQ1: Among our participants, 76% (99 out of 130) had used a generative AI tool(e.g., ChatGPT, GitHub Copilot); most of them (82%) agreed that the use of AI enhances their motivation and engagement in programming and CS, with 64% reporting that using AI helped them complete programming tasks.

RQ2: In terms of trust, we found disparities between participants that had used a GenAI tool and those that hadn't. In general, the non-user group was less trustful of GenAI systems: 44% of them reported a lack of trust in GenAI, whereas only 41% expressed trust. In contrast, among participants that had used a GenAI system, close to half (48%) reported trusting the system, with only 35% expressing distrust. (In both groups, about 15% were neutral).

The fact that non-users were more skeptical of GenAI systems raises questions about the reasons. Specifically, are there external factors influencing students' perceptions of GenAI? To investigate this, we drilled further into participants that had used GenAI.

Table 1 shows that, for participants using GenAI, trust in such systems was accompanied with greater confidence in completing programming tasks on their own, and with greater perceived individual benefits of using them (e.g., task completion, improved knowledge, and confidence). We also found that this trust was also negatively correlated with years of programming experience. Social factors, notably perceptions

Variable 1	Variable 2	Pearson Correlation Co-efficient
Trust in AI	Confidence programming on their own	0.32
Trust in AI	AI helps task completion	0.37
Trust in AI	AI helps when stuck	0.34
Trust in AI	AI helps improve knowledge	0.4
Trust in AI	AI makes me feel confident	0.32
Trust in AI	Professionals use AI	0.27
Trust in AI	Others use AI	0.25
Trust in AI	Years of experience	-0.29
Confidence programming on their own	Years of experience	0.32

Table 1: Correlations. For all correlations, p-value<0.05.

of others using GenAI tools, also correlated with trust in such tools.

RQ3: Finally, consistent with prior work [5], participants were concerned about AI replacing professional programmers in the future. But surprisingly, only 32% of the more trusting GenAI user group expressed such concern compared to 48% of the less trusting non-user participants.

4 ONGOING WORK

We are further exploring factors that influence such perceptions, including gender and cultural differences. We hope that these results offer insights into the benefits and effective use of GenAI in computer science education.

ACKNOWLEDGMENTS

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