



# AuthentiCT: Making CT Authentic to Learners

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## ABSTRACT

Novice learners initiating computational Thinking face challenges of complexity and have a longer learning curve to understand the interfaces. The contexts in an introductory CT lesson are seldom situated in the learners' real-life. In order to make CT authentic to learners, the environment AuthentiCT has been designed with activities rooted in learners' everyday tasks to make CT skills meaningful. A study with 16 middle-schoolers performing AuthentiCT activities showed that learners found CT relevant and applied problem-solving in similar contexts in their everyday life.

## CCS CONCEPTS

- Social and professional topics~Professional topics~Computing education~Computational thinking
- Social and professional topics~Professional topics~Computing education~K-12 education
- Social and professional topics~Professional topics~Computing education~Computing literacy

## KEYWORDS

Everyday Computing, computational thinking, situated learning

## INTRODUCTION

In the world of ubiquitous computing, learning and practising computational thinking (CT) is essential to optimise one's life using the power of computational devices. As novice learners get introduced to CT, they struggle to find a relevance of CT within their everyday life since the contexts used for CT education are abstract, imaginary or challenging [1]. Researchers working on broadening computational participation [2] and computational action [3] have demonstrated the use of Scratch and MIT app inventor workshops for making CT activities socially relevant and collaborative. But as an entry-point into CT, a more personal connection might be required to make CT authentic to everyone. **This research highlights how CT skills are connected to every learner's day-to-day life and surroundings.** We introduce AuthentiCT: an environment designed based on situated learning [4]. There are missions of everyday computing activities which learners solve using programmable smart-IoT devices. For example, setting up Alexa reminder to pack school-bag according to schedule,

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operating smart bulb to switch on at night using Google Assistant routine, etc. This paper explores learners' perception of CT after AuthentiCT.

## BACKGROUND STUDY AND DISCUSSION

16 middle school students selected by convenience sampling performed AuthentiCT activities. We operationalised relevance and authentic connection of CT to life by three means: learners perception of meaningfulness and impact of CT in real-life and how they associate CT with similar real-life contexts. Survey questions about perceived meaningfulness and impact [5] and audio recordings of semi-structured interview answers were collected and analysed. For meaningfulness, 62.5% of the learners expressed strong agreement that CT is meaningful to them. Whereas 78.57% of the learners thought that CT is impactful. 9 out of 16 students strongly agreed with the statement 'I can use programming to make my daily life easier'. From the interviews, we gathered that the learners found programming activities relevant and familiar. Some of them came up with more authentic problems, viz., "we can also programme AC or CCTV cameras like this (bulb) to operate from phone", "this could be useful for elderly having difficulty in switching appliances on by physically going there", "I can set up reminders of homework and tasks".

We observed that the learners could connect AuthentiCT to their experiences. CT became meaningful and impactful in their real world. We speculate that using real-life authentic context of middle-school learners' day-to-day tasks in AuthentiCT made association of CT with real-life possible. We aim to conduct a larger size study to validate the results. Efforts like AuthentiCT would enable learners to find a relevance of CT in their day-to-day situations, which will inspire them to solve socially relevant problems and empower them with an identity [1] of a computational thinker.

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