SolveDeep: A System to Support Learners' Subgoal Learning in the Context of Math Problem Solving

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MOTIVATION

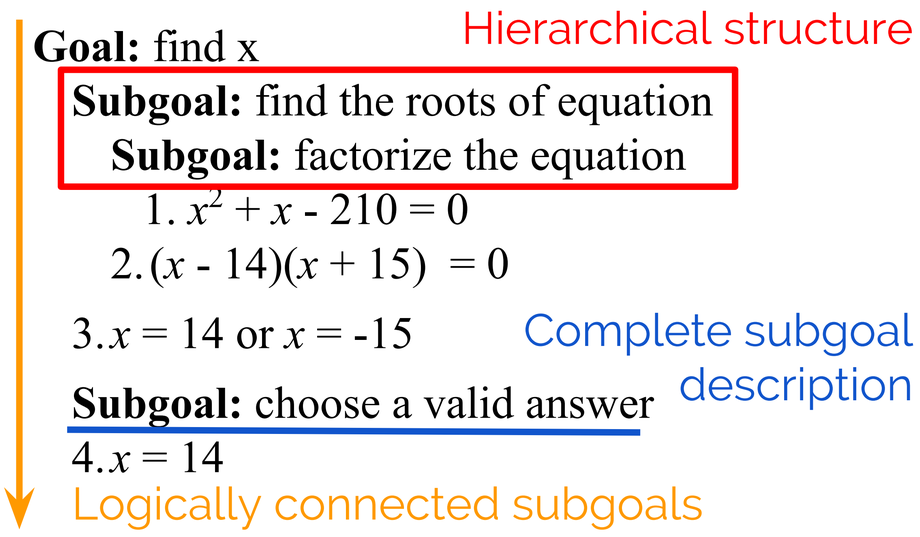
1. Learners can solve novel math problems better when they understand the goal of each step in their solution [*Catrambone*].
2. In online education, the absence of personal tutor makes it difficult for learners to correctly define goals and to get personalized guidance on the goals they defined.

PROBLEM

Online education needs to provide personalized goal-oriented guidance (e.g. Intelligent Tutoring System) to learners, but it is costly to develop such interaction [*Murray*].

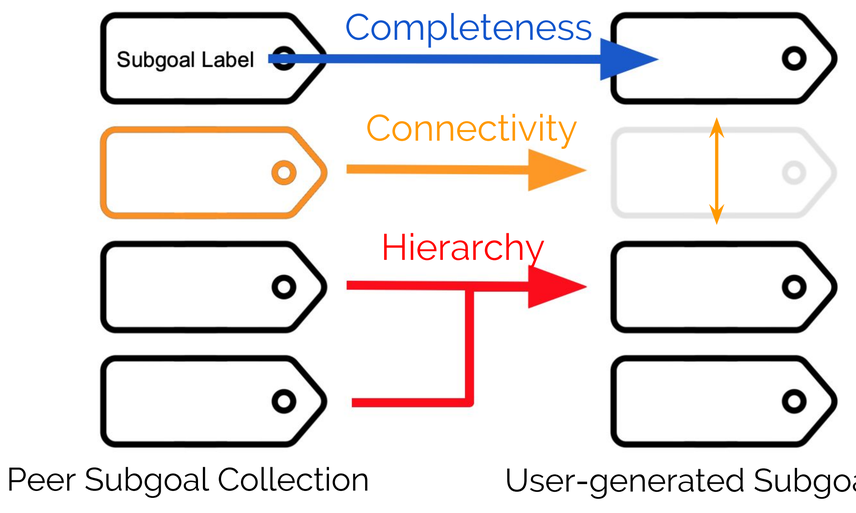
SUBGOAL LEARNING

- A subgoal is a common goal shared by a set of steps in a solution.
- High quality subgoals should be complete, connected and hierarchical.
- Learners can solve new problems when they define good subgoals.

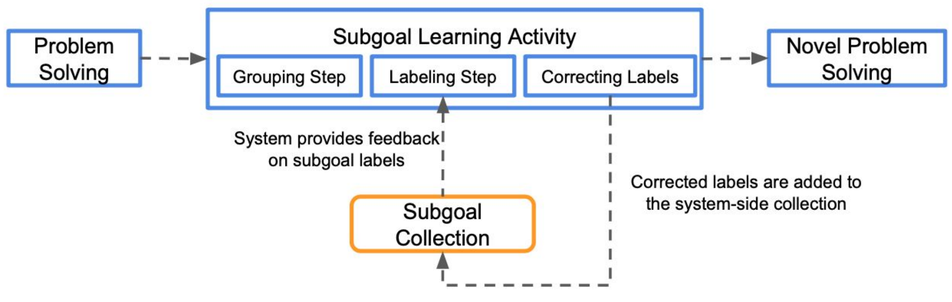


APPROACH

- Providing feedback on subgoals by comparing to peer-generated subgoals

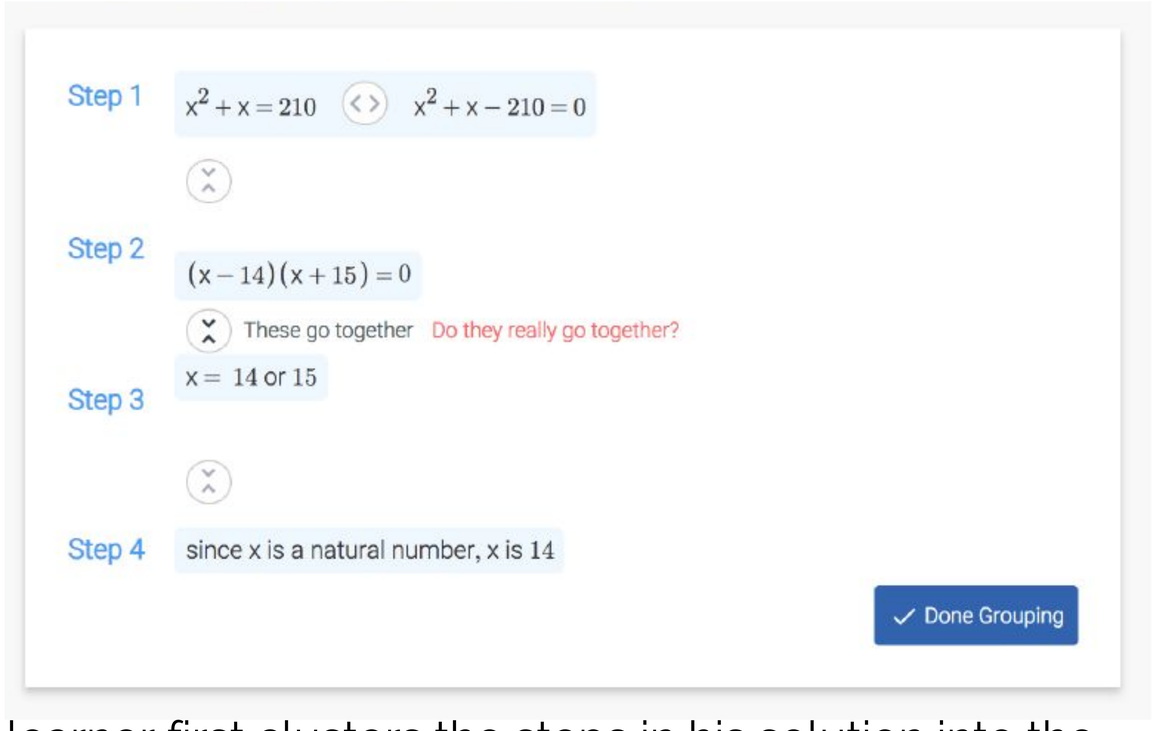


System Workflow



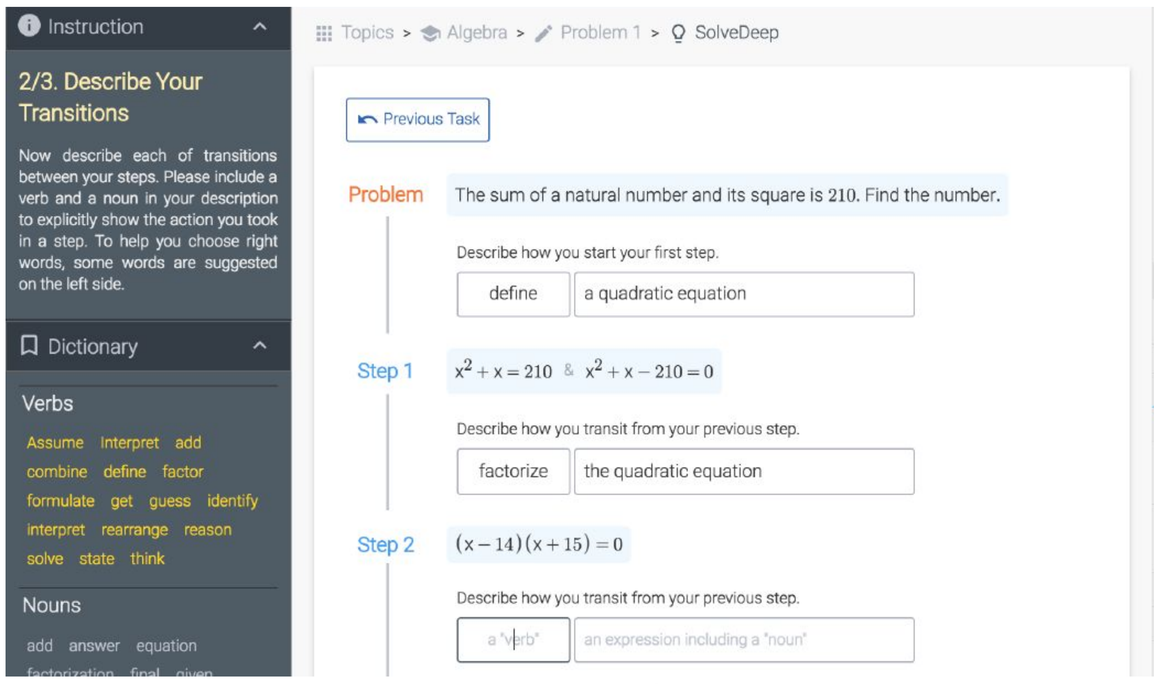
SYSTEM

1. Grouping Step



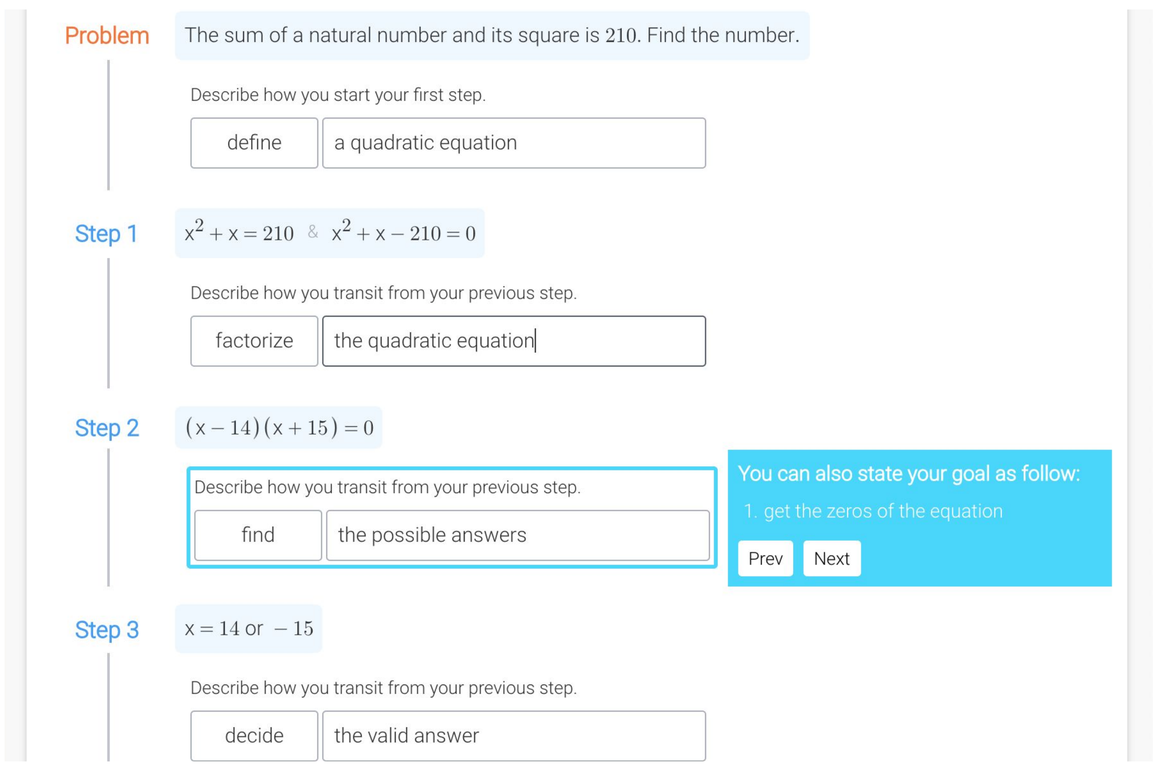
A learner first clusters the steps in his solution into the groups which share the same goal. System encourages or discourages the grouping by checking the similarities between the texts.

2. Labeling Step



The learner describes the goal of each step by explaining the how the previous step transits to the current step. Dictionary on the left suggests learners which vocabulary to use to describe their goals.

3. Correcting Label



The learner gets feedback on the goals he defined. Feedback can suggest alternative goal descriptions, missing goals, or how a goal can be further decomposed.

본 연구는 정부(과학기술정보통신부)의 재원으로 정보통신기술 연구진흥센터의 지원을 받아 수행되었습니다.