First, educational objectives must be systematised. AI is rapidly changing compared to other academic fields. Everyone, therefore, recognises the necessity of AI education for K-12, though the systematic nature or hierarchy of the topics remain uncertain. The knowledge system constituting the curriculum will vary with how educational goals are set, and education based on this can help cultivate learners' capabilities. Educational goals should thus be set considering educational philosophy, social change, learning experiences, and what students should be capable of doing.

The second implication concerns the composition of a curriculum that reflects academic sequence and continuity. Based on the structure of knowledge suggested by Bruner, a curriculum should establish sequence within K-12 education in addition to the level and scope of knowledge in relation to higher education. That is, AI education requires a curriculum considering sequence and continuity based on the knowledge covered in higher education. An AI curriculum published at the national level includes India's 9th grade AI curriculum. Other than this, there are very few to no standard curricula. An example of the curriculum composition direction is shown in Table VII.

TABLE VII
EXAMPLE OF K-12 AI CURRICULUM COMPOSITION DIRECTION

Grade	Description
1-4	Education focused on play/activities without revealing AI knowledge domains
5-6	Education utilising programming tools to understand the basic concepts and operation of AI
7-9	Education to understand the principles of AI with conceptual diagrams (pictures) and basic algorithms
10-12	Education for using data from various fields in basic AI algorithms

Rather than designing high-level AI algorithms, the objectives of K-12 education for AI should be to understand the concepts and functional roles of AI and develop problem-solving skills. As discussed in this study, however, clear directions are needed for what students should be expected to learn how to do through K-12 AI education. This is because the content and methods of education will vary with the goals. The topic modelling results in this study can only intuitively identify topics and are limited in terms of deeper quantitative or semantic analysis. Furthermore, future studies must be conducted with more extensive data.

This study is significant in that it analysed the extent of discussions on AI education in K-12 based on topic modelling and proposed future directions for AI education.

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