KNOWLEDGE GRAPH EMPOWERS THE TEACHING REFORM OF PROGRAMMING COURSES

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Abstract

Against the limitations of traditional C language programming teaching—such as fragmented learning (failing to connect old and new knowledge), restricted teaching depth/breadth (insufficient in-depth analysis of knowledge points due to class time limits), and students' over-reliance on textbook examples—and MOOCs' inability to meet personalized needs (lacking tutor guidance), this study aims to improve teaching quality and students' abilities (independent learning, problem-solving, innovation) by integrating knowledge graph and AI. First, a C language course knowledge graph was constructed via six steps: knowledge modeling (sorting core elements like data types

and pointers), data preparation (collecting materials including 295 videos and 842 PPTs), information extraction (identifying relationships like inclusion and sequence), knowledge integration (hierarchical structure), storage (in graph database), and graphical display. Then, the knowledge graph was applied to teaching: enabling AI-assisted intelligent teaching (pre-class task design, in-class knowledge visualization, hierarchical after-class exercises), building a comprehensive evaluation system (learning trajectory analysis, knowledge mastery evaluation, resource recommendation), and planning personalized learning paths. Two semesters of practice showed the knowledge graph significantly boosted students' learning interest and key abilities. Futurely, with tech innovation and expanded scenarios, knowledge graph will have broader prospects in education to advance programming course teaching reform.