Modularized Curriculum Design in Undergraduate Artificial Intelligence Education: A Comparative Study between Peking University and the University of Edinburgh

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Abstract

In the context of the advancement of artificial intelligence and interdisciplinary convergence, higher education institutions are increasingly confronted with the challenge of reconfiguring curriculum architecture. Modularized course systems have emerged as a strategy for cultivating undergraduate talent in artificial intelligence, owing to their adaptability. This paper adopts the "Intelligent Science and Technology Program (Smart Class)" at Peking University in China and the "Artificial Intelligence and Computer Science (BSc Hons)" at the University of Edinburgh in the United Kingdom as cases, and conducts a comparative analysis of their modular curriculum structures, competence-oriented pathways, and implementation mechanisms. The study finds that the two universities operate within distinct educational frameworks; they both emphasize "competence development" and construct modular configurations centred on foundational knowledge, core competencies, and frontier exploration. Peking University's Smart Class emphasizes the tiered progression of mathematical and scientific foundations, fundamental theories of artificial intelligence, and research engagement, thereby establishing a structure designed to cultivate innovative talent. The University of Edinburgh supports students in constructing knowledge trajectories through liberal elective mechanisms and credit-bearing modules, reflecting the development of curricular elasticity and interdisciplinary integration capacity. The paper proposes a "3×3 Module Development Framework" for AI education, which includes three categories of modules (foundational, core, and frontier) and three mechanisms (competence progression, pathway integration, and content renewal), to support universities in establishing coherent yet learner-responsive curriculum systems. The study offers structural models and strategies, with potential for cross-system adaptation and curriculum redesign.

Keywords: cross-border education; instructional models; learning; talent cultivation; university reform