

(二) 計畫英文摘要。

Keywords: Programming Learning, Instructional Assistance, Concept Knowledge Ontology, Learning Resource Management, Assessment and Diagnosis.

Programming Design is a sophisticated skill and imaginative ability. Accordingly, in order to achieve the proficiency and mastery, we have to not only learn the programming concepts and system design knowledge, but also perform the practices and thinking frequently. Then, we can acquire the required programming capabilities and skills, such as knowledge concepts, logical analysis, and problem solving. Therefore, based on the learning theory of knowledge construction, this project aims to design and propose an **Instructional Assistance and Learning Support Environment in Programming Design** to assist teachers in programming instruction, resource management, assessment, and diagnosis, and to support students in programming learning, practice, cooperation, sharing, and peer-assessment.

Thus, in this project, the research items and system modules that will be done are shown as follows:

- (1) Design and develop the Instructional Assisted System, including 1) programming instructional contents authoring module, 2) programming instructional resource management module, and 3) programming instructional assisted analysis and diagnosis module, to support teachers in efficiently constructing and managing the learning resources, and offering the learning diagnosis feedbacks to students and further refining the teaching strategies by means of the learning portfolio analysis.
- (2) Design and implement the Learning Support System, including 1) programming learning aided module, 2) programming assessment module, and 3) cooperative programming learning module, to provide students with the learning guidance and practice, the experts consultation and examples searching, and the assessment feedbacks in a sharable, interactive, and cooperative learning space.
- (3) Analyze and discuss the efficacy and satisfaction of proposed system services for teachers and student, respectively.