霍蒲菲爾遞迴式類神經網路系統融入電路學課程建構於Moodle數位學習平台之教材發展、教學實驗及其成效評估之研究

盧建余; 張寬裕; 廖錦文; 蔡循恒

摘要

本研究主要採用能力分析模式,從現實工作的角度來思考及描述個人在自動化機電設備產業上需要達成的「成果期望」,建構出一套以「霍蒲菲爾遞迴式類神經網路系統融入電路學課程」之 Moodle 數位學習平台教學模組,同時發展課程、設計教材、實施教學及成效評估。本教學模組除了可以使學生瞭解 Moodle 數位學習平台之基本特性、功能及應用外,也可以讓學生學習霍蒲菲爾遞迴類神經網路動態系統,控制系統分析包含李亞普若夫函數選擇、二次型線性矩陣不等式的使用、控制系統的響應模擬及電路分析與狀態方程式的建立等學習,達到控制系統工程與技術的應用。更進一步讓學生透過「網路合作學習策略」,以培養學生創造思考、問題解決、團隊合作之目的。本計畫預計為期四年,第一年主要在訪談 10 家自動化機電設備產業公司及 2 家顧問諮詢公司,訪談對象含 3 位高階主管、3 位生產製造工程師、3 位技術服務工程師及 3 位行銷服務工程師,建立專業能力內涵,提供專業能力指標、工作描述、學習與訓練需求及評量規準,進而發展

課程；第二年則進行以 Moodle 數位學習平台為基礎，將專業能力內涵融入「霍蒲菲爾遞迴式類神經網路系統融入電路學課程」之教材大綱，完成以自動化機電設備產業人才專業能力指標之數位學習教材編製與評估修正；第三年則進行以 Moodle 數位學習平台為基礎的網路合作學習策略之實驗教學及學習成效評估；第四年則藉由「產學合作技術研修」課程，瞭解並掌握學生在企業界駐廠實習適應情況，並透過 Moodle 數位學習平台，實施線上追蹤輔導學生從事產品開發或技術創新研究之成效，培育具有競爭優勢、強調團隊合作、系統性規劃及計畫整合能力之人才。

關鍵字: 霍蒲菲爾遞迴式類神經網路系統;電路學課程;

Moodle 數位學習平台;學生駐廠實習

The Study on Development of Teaching Materials and Experimental Teaching and Evaluation of the Implementation Effectiveness toward Hopfield Recurrent Neural Network System Integrating with Electric Circuits Curriculum Combining Moodle E-Learning Platfo

盧建余; 張寬裕; 廖錦文; 蔡循恒

Abstract

This project mainly uses the ability analysis method to structure a teaching module of Moodle e-learning platform by means of Hopfield Recurrent Neural Network System integrating with Electric Circuits Curriculum to develop the digital teaching materials, to design materials, to implement teaching, and assess effectiveness simultaneously, which need to achieve the expectation of results through the perspective of the actual work and describing individual accomplishments on knowledge of automatic industrial equipments. Students will be able to understand the basic character & functions and applications of the Moodle e-Learning Platform by implementing the teaching module and study Hopfield Recurrent Neural Network System. There is the control systems analysis they should learn which includes Lyapunov functional candidate choosing, a quadratic linear matrix inequality using, control systems response simulating, and circuits analyzing & the state equations of the circuits constructing for reaching to the application of control systems engineering & technology. Moreover, they are going to acquire their creative thinking, problem-solving competence, and the purposes of teamwork skills via Cooperative Learning Network Strategy. This project is expected to last four years. The first year, the primary work is to visit and survey the specialists from 10 enterprises of the automatic industrial equipments and 2 consultants & consulting companies, those interviewers involve 3 the executives, 3 manufacturing engineers, 3 technology service engineers and 3 marketing service engineers in order to establish the professional ability connotation, to provide the professional ability index, work describing, learning and training requirements and assessment standards. Further, the target is to develop Curriculum. The second year, based on Moodle e-Learning Platform, we develop the digital teaching materials of the teaching module and combine the professional ability connotation together to integrate Hopfield Recurrent Neural Network System with Electric Circuits Curriculum and accomplish to edit the

e-learning materials of professional ability index on automatic industrial equipments, and its assessment & revision. Using Moodle e-Learning Platform implementing teaching and result assessments of the Cooperative Learning Network Strategy will be performed in the third year. The final year, we can comprehend well students' the practice situations in the enterprises and implement online tracking to guide students for their performances on product developing and technology innovating. Furthermore, to cultivate students to be a person who will be with being competitive predominance, emphasizing the teamwork skills, and an ability of systematicness scheme & plan integrating.