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提升光電元件設計能力之專題導向式課程設計與成效評鑑

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摘要

本研究旨在針對政府之「國家發展重點計畫」—光電元件產業所需之「光電元件設計能力」進行調查，並據以發展「光電元件設計專題導向式課程」。研究首先採模糊德菲法(Fuzzy Delphi, FD) 建構能力指標暨模型。再根據「以模擬為輔之建構詮釋教學設計模式」(Simulation-assisted ICON）.. 針對「發光二極體元件設計」進行專題導向式課程發展，據以提升學生在此類元件設計之能力；此外，根據此類知識與技術內涵，發展「概念圖」、「以模擬為輔之建構主義式學習環境量表」、「光電技術的態度量表」、「光電元件設計構想評分表」等評量工具，以檢證教學成效，作為技術能力培育之依據。本研究共分三年進行，各年度目標臚列如下：第一年 光電元件設計能力指標之建構；第二年 光電元件設計專題導向式課程設計與成效評鑑工具之建構;第三年 發光二極體元件之專題導向式課程實施及成效評鑑。本研究成果—「光電元件設計能力指標」之建構、滿足產業需求之「光電元件設計專題導向式課程」、相關成效評鑑工具，以及學術發表，在技術教育的理論上有具體的貢獻外，亦可作為日後相關工程設計課

程發展之實際運用參考。是以本研究具創新與實務應用之綜效。

關鍵字: 專題導向式課程;能力指標;建構詮釋教學

Enhancing the Skills of Photonics Device Design through the Project-Based Course Development and EVA

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Abstract

The study aims to investigate the needs of the photonics devices industry—one of the key industries in the development policy for Taiwan government—to develop the project-based course for photonics device design. The competency index and evaluation model for the aforementioned industry will be constructed by the Fuzzy Delphi (FD) method. Moreover, the study develops the project-based course of Light-Emitting Diode (LED) device design based on the Simulation-assisted Interpretation Construction Design Model to enhance the students』 skills in photonics device design. In the meantime, the concept map, the Simulation-assisted Constructivist Learning Environment Survey, the photonics technology attitude survey, and the photonics device design survey are developed to evaluate the learning achievements. Hopefully, the results of the study will be a useful point of reference for technology education. The study will be preceded in a period of three years. In the first year, the competency index of the photonics device design will be constructed. Then, the project-based course and the evaluation instruments in the photonics device design will be developed. Finally, the project-based course in the LED device design will be implemented and evaluated. The outcomes of this study— the competency index and evaluation model for the photonics device design, the project-based course of photonics device design which meets the industry, the evaluation instruments, and the research results— will be a contribution to technology education and be the reference of development for the related engineering design course. Therefore, the study proffers a synthetic effect between innovation and practical application.

Key words: Project-Based Course;Competency Index;
Interpretation Construction DesignModel