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產業導向技專校院學生科技與社會基礎科學能力提昇之研究---

數位學習對技專校院學生光電科技與日常生活素養提升之研究

『基礎應用科學教育』

陳清檳;陳狄成;陳文中

摘要

本研究旨在探討數位學習對技專校院學生光電科技與日常生活素養提昇之研究，為達此研究目的，本研究首先探討技專學生認知負荷、數位學習、光電科技與日常生活素養之教學策略與方法以及數位教材發展策略與流程、技專校院學生學習困難、學習策略、學習成就及其學習態度之理論與相關研究，進而建構數位教材發展策略與流程、學習診斷量表初稿與數位學習認知負荷量表（統一由總計畫負責發展）初稿。接著利用文件分析與訪談五位光電科技專業人士，歸納適合技專校院學生光電科技與日常生活素養之課程單元內涵，選出五位光電科技與日常生活素養之學者專家舉行專家座談，以修改並確認光電科技與日常生活素養指標及內涵之適切性。為歸納二十位專家學者對於技專校院學生光電科技與日常生活素養能力項目的看法，進行三次德懷術問卷調查法，最後，運用模糊層級程序分析法（FAHP），建構技專校院學生光電科技與日常生活素養之能力項目與課程單元內涵，共

計光電工程基礎能力、光電元件應用技術能力、光電顯示器基礎技術應用能力、太陽能電池技術應用能力與生醫光電應用能力五大能力項目、15 項知識單元及 59 項知識項目。

關鍵字: 數位學習;技專校院;光電科技與日常生活素養;
認知負荷;模糊層級程序分析法

The Study of the E-Leaning Improves the Research of Photoelectric Science and Life Literacy of the Vocational and Technical Students

陳清檳;陳狄成;陳文中

Abstract

The aim of the research is to study improvement of applying e-leaning on photonics technology and daily life accomplishment for vocational and technical college students. In order to reach the purposes, the study first investigated teaching strategies and methods of cognitive load, digital learning, photonics technology and daily life accomplishment as well as relevant researches and theories regarding digital teaching material development strategies and process, learning difficulties, learning strategies, achievement and learning attitudes among vocational and technical college students. Furthermore, the study constructed the development strategies and process for e-learning material and the first drafts of learning diagnosis inventory and learning cognitive load inventory (developed by chief planner). Next, document analysis was used and five photonics technology experts were interviewed for generalizing curriculum unit content for photonics technology and daily life accomplishment. Five experts were invited to an expert panel for revising and confirming the suitability of indicators and content for photonics technology and daily life accomplishment. To conclude opinions from twenty experts, three times of Delphi Method were carried out. Ultimately, the research adopted Fuzzy Analytical Hierarchy Process (FAHP) to construct competence indicators and curriculum unit content. The results yielded 5 competence indicators (basic competence for photonics, application competence for optoelectronics devices technique, application competence for basic technique of display, application competence for solar cell technique and application competence for biophotonics), 15 knowledge units and 59 knowledge indicators.

Key words: E-learning;Vocational and technical;
Photoelectric science and life literacy;
Cognitive load;FAHP