Establishing a New Paradigm in Engineering and Technology education: An Experimental Analysis of Multiple Learning Methodologies and Examination of Cognitive Profiles of Continuing Education Students

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Abstract
This study consisted of two inter-related components. The first part compared three instructional methods for delivering a Computer Aided Design (CAD) course for adult Continuing Education (CE) students. The second part established a comprehensive cognitive profile matrix of adult continuing education students entering careers in technology. The first part examined the use of three delivery methods, using three randomly selected groups of students. The three methods were as following:

- Traditional classroom-based training.
- Instructor-facilitated course presented online.
- Independent study, using a CD-ROM tutorial.

The experimental design consisted of three randomly selected sample groups of 20 students. The independent variable in the study was the instructional method. The dependent variables were the academic achievement scores and the satisfaction levels of the participants.
As a second component, the study determined a cognitive profile of adult continuing education students. This analysis involved the same group of 60 students and presented a quantitative matrix of learning styles (by way of the bi-polar cognitive profile matrix.

After obtaining all of the statistical data, a correlation analysis was performed, comparing cognitive profiles students versus the instructional methodology.

The academic achievement analysis yielded the following results:

- There was a significant difference between in-class and online course, where in-class method showed higher academic achievement results.
- There was a significant difference between online course and the CD-ROM based course. In this case the CD method was more effective than the online method.
- There was no statistically significant difference between the in-class and the independent CD-ROM methods.

The correlation analysis established that no significant correlation existed between the achievement and learning styles of the students. The results indicated that overall academic achievement within the subject of CAD are equal for all cognitive profile categories, allowing people with different learning styles to achieve their desired levels of academic success, as well as to meet their educational goals. The results of the Objective Course Satisfaction and indicated that there was no significant difference among the three groups. It was, therefore concluded that the objective course satisfaction was equal among the three methods of instruction described in this study.

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