

Chapter 10

Development of a Mobile Application for Learning Style Prediction

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ABSTRACT

This chapter presents the development of a mobile application through the use of intelligent systems adapted to learning styles in accordance to the models of Felder-Silverman and Kolb. This development takes place in a Java programming language within the Android Studio development environment, which at the same time uses the SQLite mobile data base. The mobile application allowed the authors to identify the learning styles of students from the Mechatronics Engineering academic program that show some sort of educational backwardness in the subject of differential calculus. It was found that, according to the Felder-Silverman model, the style that predominates among students is the auditory style, while in accordance to the Kolb model, it was identified that the reflective style was the most common learning style amongst mechatronics students. It is concluded that through the use of this mobile application, students are able to identify the learning style, predict, and apply appropriate learning techniques to their learning style.

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INTRODUCTION

This document shows the development and justification of a mobile application through the use of intelligent systems, which are adapted to learning styles according to the models of Silverman and Kolb. This mobile application analyzes learning results of students studying differential calculus in the Mechatronics Engineering academic program at Universidad Politécnica de Sinaloa in Mexico. Students who take this subject have the highest rate of academic failure. In light of this problem, there's a desire to know the factors that have an impact on low academic performance and to analyze their possible causes and consequences. The current enrollment in the Mechatronics Engineering academic program numbers some 396 students, out of which 13.88% have three or more failed subjects, 10.6% have two failed subjects, and 14.8% have one failed subject (UPSIN, 2017). Different factors that affect students' performance have been identified, and include personal, familiar and attitude aspects. Another aspect that has been identified is that students are not aware of a certain study methods or appropriate techniques.

Students present different characteristics and ways of learning; it is considered that learning styles should be considered as a *priori* instrument, as they allow students to develop abilities and skills to better process information with the aid of teaching materials, study tools and techniques which are appropriate for each student. Each student perceives, assimilates and processes information to build his or her own learning.

To analyze this problem, it is necessary to mention the definitions of failure, academic delay and learning styles. González-Montesinos and Backhoff (2010), define failure as the condition of failing or repeating at least one level, and the lack of motivation to study. Respectively, Castaño et al. (2015) define failure as a variable that contributes to increasing students' participation and success. Isaza Restrepo et al. (2016) define academic delay as the early withdrawal of a student from an academic program before obtaining a degree in a period of time long enough to discard the possibility that the student returns to the program.

Regarding the learning styles models that will be used as the foundations of the development of the mobile application, the methods' definitions are as follows. According to Olivos et al. (2016), The Kolb model was proposed by David Kolb in 1976 and is particularly useful for comprehending the reasons and needs of students' learning. This learning model considers the psychological processes of perception and processing. The experiences of the students are divided in two central concepts: the former, which includes the elements of concrete experiences and abstract conceptualization, and the latter, whose elements represent a continuous relation between active experimentation and reflective observation. The combined scores obtained from each of these central concepts show the student's learning

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