# PCL EVOLUTION PROJECT, GATHERING INFORMATION TO IMPROVE TEACHING-LEARNING PROCESSES

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## Abstract

Everyone has their own way of learning, understanding concepts and assimilating knowledge. A learning theory try to describe how people and animals learn, helping us to understand the complex process of learning. There exist different theories about learning.

How do we learn? Is the learning style of each individual something stable or changeable along his/her life? Why teachers are unable to achieve their students understand the knowledge they are trying to transmit? These are the questions, amongst others, that make us to think about whether commonly used teaching methods are the most suitable or not.

On the one hand it is necessary and essential a wider knowledge and understanding of each individual learning style. On the other hand, we must consider that the teachers' teaching style is influenced by their own learning style, whereupon there will be also different teaching styles.

The Preferential Complementary Learning (PCL) is a new style model that facilitates various aspects of teaching-learning processes: the understanding of students' learning processes, an individualized guide according to their learning profile, and, in general terms, the improvement of teaching-learning processes. The whole group of learning style that compose this new model can be found in the human nature, but only one of them is a preferential one and describes the role developed by the individual when he or she learns.

A very interesting field of research that contributes to the research of both, learning and learning styles is artificial life, a field of study which examines systems related to life, its processes, and its evolution through simulations using computer models, robotics and biochemistry. A cellular automaton is a discrete model studied in computability theory, mathematics, physics, and complexity science, amongst others. This area and model of the artificial intelligence field could be used in the learning field to simulate and study the progress of a student population. This is the main challenge of PCL evolution project.

The aim of PCL evolution project is to study the evolution of a student population with different learning styles. This study is made using artificial intelligence techniques: cellular automata which can develop -using the rules observed- an estimation of what will happen with this population in the future.

This paper exposes the experience acquired in the study of different evolutionary algorithms to be used in the monitoring of a student population according to their learning profiles and the learning methodology used for each group. Besides, shows the different stages of the development process, which includes from planning to development and analysis of information. This work has been developed within the frame of an innovation project for various official degrees from the University of Las Palmas de Gran Canaria.

Keywords: Artificial intelligence, natural computing, evolutionary algorithms, cellular automata, computability theory, learning process, preferential complementary learning, learning processes, learning styles, educating methods.