

# Chapter 124

## A Linguistic Recommender System for Academic Orientation

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### INTRODUCTION

Students must face up to decision making situations since early ages, in order to keep on the chase of some professional competences. However, the suitability of people in jobs or studies is not only based on their preferences. Other factors are involved: capacities, skills, social attitudes, etc. that must be taken into account to successfully decide (Salgado, 1996).

Many countries have created a so-called advisor figure, whose role is to guide them in decisions regarding their academic future. Advisors consider different criteria and indicators in their task, the key one being the student's marks. Marks mean much more than a simple assessment: they indicate not

only knowledge, but also skills, preferences about fields, attitudes, etc.

Advisors generally are required to guide support several hundreds of students and hence analyze large amounts of information. The aim of this contribution is to support them in their task of guiding students by means of Decision Support systems (DSS) that uses students' marks and provides linguistic information about the choices that students can make.

We found out that the analysis of huge amount of the data by advisors to make recommendations follows a similar scheme to personalized marketing in Internet accomplished by Recommender Systems (RS) (Adomavicius, 2005; Resnick, 1997). These systems offer recommendations to users according to their preference profiles, guiding them through search spaces to find the most suitable items for their needs.

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Due to the complementarity between the necessities of Academic Orientation and the facilities of RS, we have developed OriEB, a Web-DSS for Academic Orientation based on a Collaborative RS (CRS) for supporting advisors in their student guidance task. RS usually compute numerical degrees to rank the best items to be recommended. But in Academic Orientation we consider more appropriate the use of linguistic values (Martínez, 2007; Zadeh, 1975) for supporting advisor's tasks in order to manage the vagueness and uncertainty inherent to the problem, rather than precise numerical values that may mislead students, because predictions are just approximations.

## PRELIMINARIES

### Academic Orientation and Collaborative Filtering

The goal of this chapter is to establish the basis for a linguistic DSS based on a Collaborative Recommender System for Academic Orientation. Therefore, we review concepts about Educational Systems, Academic Orientation, Collaborative filtering and the Fuzzy Linguistic Approach in order to introduce a basic knowledge about them to understand our proposal.

### Educational Systems

The concept of Academic Orientation is related to the student curriculum guidance, i.e., students make decisions about their curriculum in order to obtain a degree. So the Academic Orientation consists of supporting students in such decisions by means of advices that facilitate their decisions in order to be successful in their academic choice.

To clarify the concept of Academic Orientation we have studied different educational systems to extract common features to show the generality of our proposal: although we focus in Baccalaureate

orientation, by using a proper dataset the system could help students of any education level and/or area. In fact, we have observed two common features in most of educational systems: *Specialization and Evaluation*.

### Specialization

Most educational systems allow students to choose among different specialization branches according to their skills, preferences and marks, building a personalized curriculum so-called *Academic Profile*. Each branch consists of a set of core and elective subjects.

Academic branches can group subjects in *profiles* or *modules* which allow students specialize in an area. Modules consist of *module* and *elective* subjects. The former are specific of the module although can be shared by several modules. The latter can be selected independently of the module.

Academic institutions offer at least core and elective subjects. Additionally they can offer modules to build an Academic Profile. The objective is that every student reaches an adequate level of specialization. Such a level is easier to achieve whenever, the students have adequate skills or feel affinity to the area of specialization, so that the more accurate they choose the better the development of their potential.

### Evaluation

All academic institutions and educational systems have in common that they evaluate their students by means of different tools (tests, essays, tasks, etc.). The final result of this process is a *mark* that reflects not only the students' knowledge but also their skills, preferences about the subjects, etc.

### Advisors and Academic Orientation Tasks

Students must make hard decisions about the future since early ages despite they are not mature

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