Study of academic achievements using spatial analysis tools

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In the 2010/12 academic year the College of Agricultural Engineering of the Technical University of Madrid implemented three new degrees all of them adapted to the European Space for Higher Education. These degrees are namely: Graduate in Agricultural Engineering and Science, Graduate in Food Engineering and Graduate in Agro-Environmental Engineering. A total of 382 new incoming students were finally registered and a survey study was carried out with these students about their academic achievement with the aim of finding the level of dependence among the following variables: the final mark in their secondary studies, the option followed in the secondary studies (Art, Science and Technology, and Humanities and Social Sciences), the mark obtained in the entering examination to the university and in which of the two opportunities per year this examination takes place the latter mark was obtained.

Similarly, another group of 77 students were evaluated independently to the former group. These students were those entering the College in the previous academic year (2009/10) and decided to change their curricula to the new ones. Subsequently, using the tools of spatial analysis of geographic information systems, we analyzed the possible relationship between the success or failure at school and the socioeconomic profile of new students in a grade. For this purpose every student was referenced assigning UTM coordinates to their postal addresses.

Furthermore, all students' secondary schools were geographically coded considering their typology (public, private, and private subsidized) and fares. Each student was represented by its average geometric point in order to be correlated to their respective record. Following this procedure a map of the performance of each student could be drawn. This map can be used as a reference system, as it includes variables as the distance from the student home to the College, that can be used as a tool to calculate the probability of success or failure for the new coming students in the following academic years.

Keywords: Academic achievement, spatial analyst, GIS, Bologna.