

**Loyalty index of students, a view from the Tesjo stage with data mining**

LÓPEZ-GONZÁLEZ, Erika\*†, ALEJO, Roberto and VELÁZQUEZ, Juan

Received January 8, 2014; Accepted June 12, 2015

---

**Abstract**

School dropout is the phenomenon of dropout due to the confluence of external and internal to the institutions that deal with student loyalty counterpart, the main causes of dropout are summarized in this paper according causes a school survey research including working it from the conventional part and the part that addresses the data mining helps determine the thresholds and / or patterns of dropout at a higher level; likewise the case of loyalty is addressed in Higher Education Technology Jocotitlán.

**Desertion, loyalty, factors, data mining.**

---

**Citation:** LÓPEZ-GONZÁLEZ, Erika, ALEJO, Roberto and VELÁZQUEZ, Juan. Loyalty index of students, a view from the Tesjo stage with data mining. ECORFAN Journal-Spain 2015, 2-2: 133-139

---

---

\* Correspondence to Author (email: Lz\_erika\_gz@yahoo.com.mx,)

† Researcher contributing first author.

**Introduction**

According to the Census of Population and Housing 2010, in Mexico there are 3,536,369 people attending high school, this represents 5 100 inhabitants which means that only a fraction of young people are embedded in the education system national after 16 years; exacerbating this problem since most leave school because he prefers work, the school does not meet their expectations, their parents did not want to continue studying or because of family economic conditions resulting from the lack of preparation that have had their parents. Considering the importance of achieving lower dropout rates need from the data to be analyzed reliably structuring and coherence among them is needed, it is also necessary to consider that the data contains important information not perceptible.

This paper presents a proposal to develop a system able to automatically identify in real time with students likely to drop out at the Tecnológico de Estudios Superiores de Jocotitlán (TESJo). Also preliminary results of the analysis of the personal and academic data through data mining generations of 2010-2014 are presented. The main contribution of this work is that the claims presented can be used to understand our academic community.

**Problem Statement**

At the end of the school year for each generation of the School of Engineering in Computer Systems TESJo, it shows that the enrollment of students admitted is completely contradictory to which graduates have been considered different factors that trigger this event among which have identified the following:

- a) Lack of information about the race.
- b) Lack of financial resources.

c) Lack of vocation for the race.

d) Poor academic performance.

In this work different harvesting techniques dropouts are described in other case studies. Also mentioned systems to automatically identify in real time with high students likely to drop as data mining, to complete an analysis of Higher Technological Studies Jocotitlán where there is an important fact of loyalty shown to be It considers important regarding the dropout rate.

**Development****Dropout factors based on research**

School dropout is the phenomenon of dropout due to the confluence of external and internal to the institutions of higher education that has to do with factors of social and personal context of the student causes; as quoted by Rodriguez (2011) in the study of dropout; against party loyalty can be understood as a high degree of commitment and satisfaction with student experience at the institution where you are.

In this sense we have generated several studies to identify the main causes of school dropouts to decrease this situation and eradicate this phenomenon as possible. Such is the case of the University of South Colombian Education mentioned that the main factors dropout according to Sanchez (2005) are: personal, academic, socioeconomic and institutional. Also in a publication by the National University of the Coast, Santa Fe Argentina Zandomeni, a sample of 77 students was considered, the results obtained from this research show that the dropout involves several factors like interests, expectations, inclinations towards one or the other area of expertise and institutional issues also appear and educational organization, personal.

Family and work that triggers both students, educational institutions and government agencies involved in university politics. In the analysis of explanatory models of student retention in college written by Donoso (2007), desertion is a way of weakening the initial intentions to follow up his career, where one of the main factors for the output are family history, skills and previous schooling.

The academic factors as the problems of low achievement, repetition, lack of discipline and study methods; deficiencies in academic programs that deal with traditional teaching, academic dissatisfaction, lack of career guidance that is manifested in an inadequate choice of career or academic institution and lack of fitness; are the main causes of dropout as observed in the study of Autonomous University of Puebla by Wietse de Vries (2011). In this investigation it was established that the main causes of desertion were complicated schedules, was not the vocation, the profile of the race, worked and the difficult economic situation; Taking these considerations suggest including reviewing schedules to make them more flexible and does not affect students and promote a system of scholarships for those in need.

Also the college dropout in Mexico in the experience of the Autonomous Metropolitan University Rodríguez (2008) and based on a comparative assessment of populations through surveys deserters and workforce between generations 1994 and 2003 noted that 46.9% defected definitively and 42.1% rejoined another race, which is a high percentage for those who leave their professional studies, also it mentions that desertion is early ie in the first three quarters of the race; Among his most notable dropout points they were found: work activity, home economics and school performance.

An outstanding factor in the dropout are cognitive problems, as cited in a test applied by the Polytechnic University of Sinaloa, in this study expert system of university preferences to a population of 206 aspiring different engineering, it was noted that students whose profile Noted for the test match the selected race had a high academic performance, while those who agreed not show low interest and academic achievement, encouraging the defection as quoted Briseño (2011) arises in these cases. Also a history found at the Autonomous Metropolitan University is that most of the dropout occurs in the first semester especially when there is the registration period to freshmen in universities, ie students stay in schools second option until they again try to enter schools and desired career: the study was conducted in eight races and 1577 subjects described by Duran Encalada. In this analysis the dropout phenomenon is observed in three modes: the voluntary, ie that incurred by statutory provision and the potential when the student ignores their academic activities for whatever reason.

Also the socio-economic factor such as low family income, unemployment, lack of family support, incompatibility between work and study schedule. Strategies to overcome the dropout according Velez (2004), is a predominant factor, since a study was conducted to 378 deserters through two questionnaires, determining that the economic problem is one of the main causes by 59% followed by incompatibility with the race with 29%, coupled with this dropout is exposed between the first half of the race with 89%. Similarly with a sample of 749 young defectors 51.4% decided to work and put aside their professional studies.

### Dropout factors and data mining

To predict the student dropout from the raw material is inevitable start from the data that can provide voluntary and involuntary student, since they have more information than is judged by the naked eye, in this sense data mining to determine the causes attrition using historical data, a process of knowledge discovery in databases (KDD), or "the process of extracting previously unknown information, valid and useful in large databases and uses the information to make decisions crucial "as quoted Azoumana (2013).

In this context the analysis of dropout in the Simon Bolivar University, according Azoumana (2013), applied to a population sample of 707 individuals using data mining techniques, using decision tree algorithm and the algorithm of neighbors k closest, WEKA, work Mark Hall (2009) for generating the results are used; half loss, financial difficulty entering the labor market, other interests and indeterminate, five were considered causal. Its results have a margin of 94% confidence determining that the main cause of attrition is unknown factor with 65% according to the five grounds, followed by financial difficulty with a loss of 8.7% and 4.2% semester.

It is convenient to say that one way to predict the dropout is to use techniques of data mining, as quoted by Ventura (2012), where he worked with a sample population 670 and 77 attributes or variables that were selected 15, in step of data reprocessing algorithms re-rolling as SMOTE WEKA, at the stage of experimentation were used 10 classification algorithms provided by this tool is manipulated because classification rules are obtained with decision trees easy interpretation will identify students with problems or trends to abandon their studies, which will allow for an adequate system of early warning of desertion.

Proposal and results tesjo loyalty index

The present work was focused in the 2010-2014 Generations career in computer systems engineering from Tecnológico de Estudios Superiores de Jocotitlán, considering that 831 students were surveyed with turarías format, record of identifying students tesjo-fo-39 ; which questions related to academic, socioeconomic and family background of each student that can help determine the main causes of dropout or loyalty index presented by the student.

It is also noted that each year school starts the race for the freshmen are about 130 of them for the generation that graduated in 2014 were under 40; It can be determined that more than 50% of students are lagging or did not complete the race. Therefore an automated system that is able to determine the main causes of desertion and act on the data collected, is proposed steps that are considered for the proposal are seen in Figure 1.

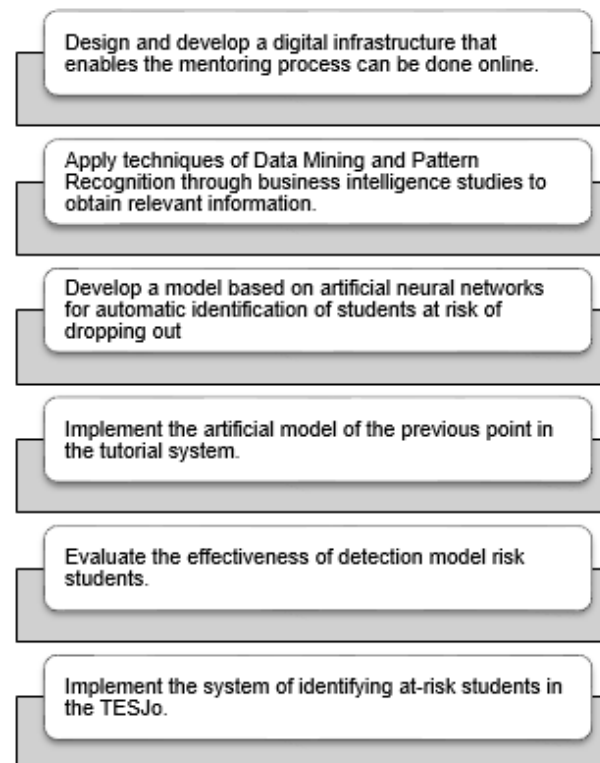


Figure 1 Proposal dropout rate.

So far they have worked the first two steps of this proposal and has obtained the following preliminary results:

Of the 831 students surveyed, 269 students have another degree in mind, it is obtained the following chart, Figure 2.

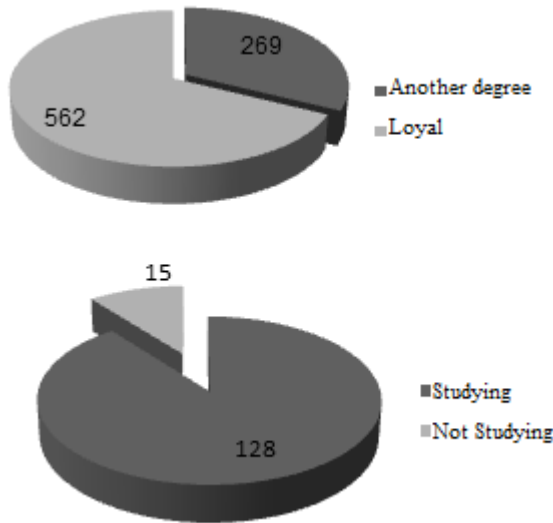


Figure 2 Index loyalty

60% of students who take medications, their parents have different studies of secondary school

All Students 4% have no reason not to conclude, was his first choice and have no degree in mind, ie are completely loyal to the race; and some other data are seen in Figure 3.

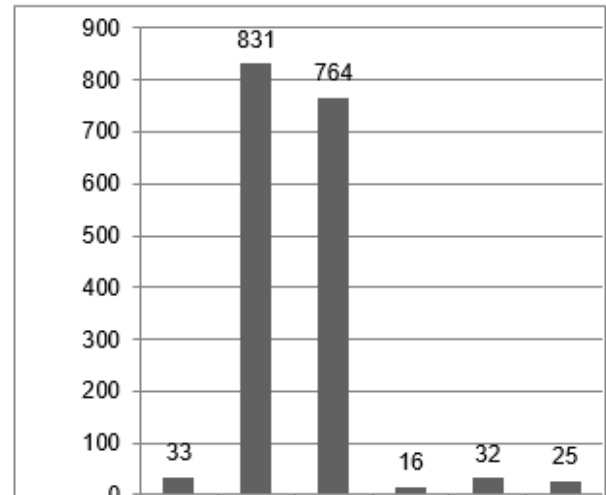


Figure 3 Desertion factors

Of the main causes that have been identified to have no loyalty to their professional studies at first point is that the students have another career in mind what hinders this point since students are there because they have no other at the moment and sooner or some decide to retire early; however is to guide the student to leave coupling and adapting to the race, the approach to the likes without taking the decision to leave; is also the action of the race was promoted as is, with profiles of study and plans that emerge from this so there is no confusion to recruit students.

The economic issue was addressed by promoting all scholarships that students can get both from the institution as government departments, all done in the registration process and during the semester.

In the case of those who are currently taking medication, it has been observed that the insurance offered by the institution to enroll helps them to resolve this situation even in severe cases.

## Acknowledgements

Tecnológico de Estudios Superiores de Jocotitlán

## Conclusions

The study shows that the problem of dropout is mostly affected by the preferences of students to another career that meets personal needs or tastes, considering that 32% of students in this sample of students has either poor performance Academic and / or incompatibility with the race, to solve this part raises institutional strategies oriented to refocus and motivate students attention, such as mentoring programs that give students continuous monitoring, raising the risk factors and the states desertion; also make a selection of candidates remainder subjectivity to the procedure used and adheres to the profile of the race, supporting the academic performance, this of course does not remove responsibility the student's academic performance.

Another factor impeding loyalty to the race is taking medication or disease may suffer the student, for these situations the institution to all students who are currently enrolled technological are provided health insurance.

And finally, the economic factor because only 2% of the students work and almost 4% have someone under them, to solve this factor acquaint the students of the various scholarship programs that provide both educational institutions and government.

In this sense the use of data mining to predict dropout is certainly adequate for consent to gain a thorough understanding of the data and can analyze the behavior of the student generating useful learning-teaching thresholds that allow early identification of the pattern of institutional neglect.

It certainly that a job that can address a national and even international issues, however each case study is different and each of them is unequal causes and prevention measures that should be covered in different ways.

## Referencics

Azoumana (2013). Análisis de la deserción estudiantil en la Universidad Simón Bolívar facultad Ingeniería de Sistemas, con técnicas de minería de datos. *Pensamiento Americano*, 41-51.

Ballesteros (2014). Minería de datos educativa: Una herramienta para la investigación de patrones de aprendizaje sobre un contexto educativo. *Lat. Am. J. Phys. Educ.* Vol.7, No. 4,

Briseño (2011). Sistema Experto de Preferencias Universitario. Universidad Politécnica de Sinaloa, Mazatlán, Sinaloa.

Donoso (2007). Analysis of explicative models of student's retention at the University: A vision from the social inequality. *Estudios Pedagógicos XXXIII*, N° 1, 7-27.

Duran Encalada (s.f.). Análisis de la deserción estudiantil en la Universidad Autónoma Metropolitana.

Mark Hall, (2009). The WEKA Data Mining Software: An Update; *SIGKDD Explorations*, Volume 11.

Rodríguez (2008). Deserción escolar universitaria en México. *Revista electrónica Universidad de Costa Rica. Actualidades Investigativas en educación.*

Rodríguez (2011). Estudio sobre deserción estudiantil en los programas de Educación de la Católica del Norte Fundación Universitaria.

Revista Virtual Universidad Católica del Norte". No. 33.

Sánchez (2005). Factores de deserción estudiantil en la universidad Surcolombiana sede neiva 2002-2005. . Facultad de Educación Universidad SurColombiana.

UNESCO, (2006). La metamorfosis de la educación superior. (IESALC).

Vélez A., (2004). Estrategias para vencer la deserción universitaria. . Educación y Educadores Universidad de la Sabana Cundinamarca, 177-203.

Ventura (2012). Predicción de fracaso escolar mediante técnicas de minería de datos. IEEE-RITA, Vol. 7, Num. 3, 109-116.

Wietse de Vries, (2011). ¿Desertores o decepcionados? Distintas causas para abandonar los estudios universitarios. Revista de la educación superior, issn: 0185-2760, Vol. XL (4), 29 - 50.

Zandomeni (s.f.). Abandono en los estudios universitarios: el caso de la facultad de ciencias económicas de la universidad nacional del litoral. Universidad Nacional del Litoral, Santa Fe, Argentina, III CLABES.