

Proposal of a tool to prevent dropouts at a higher level

Propuesta de herramienta para prevenir la deserción a nivel superior

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Abstract

Dropout and low academic performance indices are latent problems in all institutions and schools at a higher level because more than half of the students who enroll at the University truncate their studies for various reasons, which in most of the time, are not academic. Moreover, the permanence and sustainability of a program of studies depend on the indicators of retention of the student population and the good performance of students. Currently, even with easy access to universities in Mexico, students have many problems during the first academic periods, ranging from personal problems to institutional factors. Analyzing the problems of desertion, this paper the authors propose the use of software tools for analysis of personality of students in order to provide a useful tool to help the teacher -tutor to prevent dropouts in universities.

Dropout, Software tools, Academic performance

Resumen

La deserción escolar y los bajos índices de desempeño académico son problemas latentes en todas las instituciones y centros de estudio a nivel superior ya que más de la mitad de los alumnos que se inscriben truncan sus estudios por diversas causas, las cuales, en la mayoría de las ocasiones, no son académicas. Por otra parte la continuación y sustentabilidad de un programa de estudios dependen de los indicadores de permanencia y buen desempeño de la población estudiantil. Actualmente, a pesar del fácil acceso a la educación superior en México, los estudiantes presentan muchos problemas durante los primeros periodos académicos, los cuales van desde situaciones personales hasta factores institucionales. Tomando como referencia lo anterior, en esta redacción se plantea el uso de una herramienta informática para análisis de personalidad de los alumnos con la finalidad de proporcionar un instrumento útil que ayude al docente-tutor a prevenir la deserción escolar.

Deserción, Herramientas informáticas, Desempeño académico

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Introduction

This document is left for the consideration of the academic units as a proposal for the implementation of a computer tool that manages to prevent and avoid high school dropout rates in higher education institutions, helping to improve the quality of education in our country.

Dropout at the higher level is a problem that has been solved with some techniques and tools such as tutorials, consultancies, socioeconomic studies, regularization classes, among others. However, despite the implementation and monitoring of tools and strategies, it has not been possible to lower the figures for the school dropout indicator.

Within the classrooms, the teacher encounters different personalities and concerns, therefore each student may have problems of a different nature and therefore it is difficult to recognize the weaknesses and strengths of the students, coupled with this we must consider that training of the teachers at the higher level is not towards pedagogy, but towards their area of specialty, which is why it is difficult to understand and know the strategies to achieve that the student acquires meaningful learning (Diez de Tancredi, 2009).

This would help students find the teaching-learning model attractive and thus not join the ranks of school dropouts. On the other hand, there is a great variety of behaviors known by the common label of "desertion"; However, this term should not define all dropouts, nor do all dropouts deserve institutional intervention (Tinto, 1989).

For this reason, it is necessary to know the factors and causes that cause the student to leave their higher studies and, on occasions, join the labor field. By knowing the possible causes, higher education institutions will be able to propose strategies and tools to achieve the permanence of students within each educational program.

Background

In technological universities, particularly in the Technological University of Xicotepec de Juárez (UTXJ), dropout rates have been very high during the last 3 school cycles, despite the educational model that proposes tutorials as a tool to support students. that the teacher-tutor guides the student during their teaching-learning process, in addition to this, an advisory model is implemented with the aim that the student reaches all their professional competencies at the end of their higher studies.

In technological universities, the sustainability of the study program is susceptible to the permanence of students; therefore, with more enrollment and less dropout, more infrastructure and supports are granted to students through programs promoted by the federal and state governments.

The educational model proposes the course of an engineering in two stages, the first consists of studying the career of Higher University Technician in two years and then completing the Engineering in 1 year 8 months. In the UTXJ the highest dropout rates are observed in the first school periods, therefore in the university higher technician careers it is where the initial enrollment is greatly affected with respect to the final enrollment as seen in tables 1 and 2.

Programa Educativo	TÉCNICO SUPERIOR UNIVERSITARIO				
	Matrícula inicial	Bajas totales	Matrícula final	Índice de deserción	Aportación Institucional
Administración Área Recursos Humanos	262	77	185	29.39%	10.96%
Química Área Biotecnología	49	18	31	36.73%	2.57%
Mecatrónica Área Automatización	117	38	79	32.48%	5.42%
Mantenimiento Área Industrial	598	237	361	39.63%	33.81%
Procesos Alimentarios	45	12	73	14.12%	1.71%
Tecnologías de la Información y Comunicación Área Sistemas Informáticos	128	40	86	31.75%	5.73%
Tecnologías de la Información y Comunicación Área Multimedia y Comercio Electrónico	30	24	26	48.00%	3.42%
Terapia Física Área Rehabilitación	370	130	240	35.14%	18.54%
Mantenimiento Industrial Área Petróleo	92	57	35	61.96%	8.13%
Fotónica	27	17	10	62.96%	2.43%
Gastronomía	76	51	24	68.00%	7.28%
Porcentaje de Deserción del Técnico Superior Universitario				37.87%	

Table 1 Dropout 2013-2014 of Higher University Technician

Programa Educativo	INGENIERÍAS				
	Matrícula inicial	Bajas totales	Matrícula final	Índice de deserción.	Aportación Institucional.
Ingeniería en Desarrollo e Innovación Empresarial	154	10	144	6.49%	14.08%
Ingeniería en Mantenimiento Industrial	217	42	175	19.35%	39.15%
Ingeniería en Mecatrónica	101	4	97	3.96%	5.63%
Ingeniería en Procesos Alimentarios	74	8	66	10.81%	11.27%
Ingeniería en Tecnologías de la Información y Comunicación	73	7	66	9.59%	9.86%
Ingeniería Profesional en Robótica Industrial	3	0	3	0.00%	0.00%
Porcentaje de Deserción de Ingeniería	11.41%				

Table 2 Engineering Dropout 2013-2014

According to the information obtained from the statistics department of the UTXJ, it is observed that enrollment decreases by more than 37.8% during the first two years and by 11.4% the rest of the engineering career, giving a total of 49.2% school dropouts during the school year. In the same way, it can be observed that in some study areas the dropout rates are higher.

Justification

The application of ICTs to improve and provide solutions to the public and private sector is not a novelty, in particular, the development of applications is increasing to provide tools that help in making decisions.

The use of socioeconomic and vocational studies provide important data for the doncentutor to make a reference to the conditions in which students enter the university, however the information is lacking to complement the personality traits that make students unique and They provide important factors for decision-making regarding activities that are assigned and work teams that are formed during the course of the career.

By having an information system that provides personality characteristics of each student, the tutor will be able to refer information to each of the teachers in order for them to analyze the teaching and learning strategies to be implemented in each group of students.

It is known that the theory of learning styles forces teachers to reflect on their teaching practices and even review and adapt their didactic strategies based on the necessary competencies of each disciplinary field (Ventura, 2011).

Dropout depends not only on individual intentions but also on the social and intellectual processes through which people develop desired goals in a certain university, so the more information those involved in the teaching-learning process have, the easier it will be to prevent that a student leaves the university since efforts can be added to help the student achieve their goals.

Development

The proposed tool to obtain information from students once they enter the university consists of an information system that was developed based on the work of Raymond B. Cattell on the 16FP questionnaire (16 Personality Factors) which does not neglect aspects of the personality because it considers this as a total being important all its dimensions, the 16 personality factors that are considered in this questionnaire are:

- A: Emotional expressiveness
- B: Intelligence
- C: Force of the self
- E: Dominance
- F: Impulsivity
- G: Group Loyalty
- H: Situational aptitude
- I: Emotionality
- L: Creativity
- M: Cognitive attitude
- N: Subtlety
- O: Consciousness
- Q1: Social position
- Q2: Individual certainty
- Q3: Self-esteem
- Q4: State of anxiety

The questionnaire is made up of 187 questions and is evaluated according to two templates called A-B and C-D, both of which cover all factors. The score values that are handled in the responses are 2 or 1, the scores are added and a score called raw score is obtained and then standard-normalized scores are obtained from a table that is provided in the commercial version of the questionnaire. In order to implement the 16FP tool, the use of an information system is proposed in order to obtain the results quickly by applying it to groups of 30 or more people simultaneously, the system was developed as a web application with PHP, CSS, JavaScript and MySQL as database manager.

Development process

For the development of the application, the "Basic SW Development Model" (Alpizar, Luis. Et al. 2014) was used, created in the UTXJ and which allows the creation of information systems using the agile development methodology SCRUM, the stages of development that were considered are the following:

Analysis: The software requirements were developed taking into account the opinion of the psychopedagogy area of the UTXJ, with this, a planning was achieved where the implementation of the questionnaire is projected to new students in September 2015. Currently the application of questionnaires is a process that takes approximately 3 months.

Design: The user interfaces were created considering 3 types and privileges (Psychology department, students and administrator). The idea is that more questionnaires can be added to the information system, which are currently applied by the psychopedagogy area, in order to have the results when the students finish answering.

Development: The application was programmed using the PHP and JavaScript programming language, plus CSS was used to achieve a suitable design. The algorithms were programmed according to the process that is carried out manually to obtain results.

Tests: Tests were carried out on the local server with 5 students to be able to debug the errors, after making the pertinent corrections, the application was installed on a server of the institution and currently works on the intranet. Although the questionnaire can already be applied to the student community, it is necessary to continue with the development to ensure that the psychology department and the administrator have a more friendly environment.

Implementation: The application is intended to be implemented in September 2015 and deliver results to the area of psychopedagogy in October 2015.

Results

Currently, the implementation module of the questionnaire is finished, therefore it can be used with new students. We are working on the administrator and applicator interface in order to offer a friendly environment to all users of the system. With the development of this project, it was observed that the area of psychopedagogy can apply more than one questionnaire to students with the help of information systems and obtain results instantly, with this, relevant data is provided to the tutors and there is a broad panorama of the situation in which students enter university.

Future work

Seeing the need to lower the dropout rates in the institution and improve the services offered by the psychopedagogy area, a planning will be carried out in which the automation of all the questionnaires that are given to students on their entrance to the university is projected. , in order to improve the quality of teaching and offer students more resources and tools that support their professional training and prevent their desertion.

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