

## Development and implementation of measuring instruments of suicide risk factors and software of capture of information and contact-follow-up for secondary level and baccalaureate students

## Desarrollo e implementación de instrumentos de medición de factores de riesgo suicidas y software de captura de información y contacto-seguimiento para alumnos de nivel secundaria y bachillerato

CASTRO-VALDIVIA, Ricardo †\*, CRUZ-RAMOS, Nancy Aracely and ONOFRE-RUIZ, Eric

ID 1<sup>st</sup> Author: *Ricardo, Castro-Valdivia* / ORC ID: 0000-0002-9329-3003, Researcher ID Thomson: G-4205-2018, arXiv Author ID: 0000-0002-7970-7855, CVU CONACYT ID: 344206

ID 1<sup>st</sup> Coauthor: *Nancy Aracely, Cruz-Ramos* / ORC ID: 0000-0002-8148-6369, Researcher ID Thomson: G-5823-2018 CVU CONACYT ID: 589129

ID 2<sup>nd</sup> Coauthor: *Eric, Onofre-Ruiz* / ORC ID: 0000-0002-2734-4052, CVU CONACYT ID: 746364

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### Abstract

According to studies, statistics about attempts of suicide are alarming, but something that is worrying is that only 20% of them receive specialized attention. Some detonating factors are indicated, such as the death of a close relative, hostile growth environments where suicides have occurred, mental health, impaired family finances, and compulsive changes in behavior. 8 out of 10 young people who try to commit suicide study, that gives the opening to contact them and generate help mechanisms for their situation. This project is focused on applying information collection instruments for students of secondary and high school educational institutions, with the purpose of detecting risk factors indicating suicide, and the development and implementation of a web application to gather this information, generate statistical reports and contact follow up to the students. The effectiveness in the implementation of this project lies in the support of the institutions, since that is where a treatment and channeling contact is generated, this makes it possible to ensure that one of the best solutions to the problem of suicides is the accompaniment of young people in their stage of academic training, from all aspects: family, tutorial, sports and psychological.

### Web Application, Suicide, Channeling

### Resumen

De acuerdo con estudios, las estadísticas acerca de los intentos de suicidio son alarmantes, pero algo preocupante, es que solo el 20% recibe atención especializada. Se indican algunos factores detonantes, tales como: muerte de un familiar muy cercano, entornos hostiles de crecimiento donde se han presentado suicidios, salud mental, economía familiar deteriorada, y cambios compulsivos en comportamiento. 8 de cada 10 jóvenes que intentan suicidarse estudian, eso da la apertura para contactarlos y generar mecanismos de ayuda para su situación. El presente proyecto está enfocado en aplicar instrumentos de recolección de información para estudiantes de instituciones de educación básica y media superior, con la finalidad de detectar factores de riesgo de indicio de suicidio, y el desarrollo e implementación de una aplicación web para capturar esta información, generar informes estadísticos y dar contacto-seguimiento a los estudiantes. La eficacia en la implementación de este proyecto radica en el apoyo de las instituciones, puesto que es ahí donde se genera un contacto tratamiento y canalización, eso permite asegurar que una de las mejores soluciones al problema de suicidios es el acompañamiento a los jóvenes en su etapa de formación académica, desde todas las vertientes: familiar, tutorial, deportiva y psicológica.

### Aplicación Web, Suicidio, Canalización

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\* Correspondence to Author (email: ricardo.castro@utcv.edu.mx)

† Researcher contributing first author.

## 1. Introduction

For the initial execution of this project we have focused on the design and development of 2 instruments that allow collecting information from a group of high school students and parents of these students. On the one hand, the application of an instrument to students was contemplated by the tutoring or psychology area of a pilot institution, which includes questions to detect symptoms and suicide detonator factors.

This test is applied at the time when the newly admitted young person comes to the institution to enroll or in the case of already enrolled students is applied by the teacher assigned as group tutor.

On the other hand, it has also been considered the application of a specific instrument (test of the area of tutorials or psychology) to the student's Parent, which allows to detect symptoms and suicide detonators of their children, this test is applied in the At the moment the parent or guardian accompanies the young person newly admitted to the institution to register to be a student or at the periodic meeting of parents who come to receive partial examination qualifications. The results of these two applied instruments have been considered to be captured digitally in a software application; designed, developed and implemented within this same project.

It is important to mention that the information capture process must be carried out by the person responsible for tutoring or psychology of the institution (exclusively by him / her), in such a way that in the capture process he / she identifies traits, aspects, symptoms, factors, etc., that allow to define trends of suicide in the students, and in this way go taking notes and adding observations in specific capture fields for it.

The software application will provide us with the capture process, the filling of data of each student, the answers to each question of the instrument, as well as functionalities so that the work team maintains contact-follow-up with the students of the groups selected for the piloting phase of the project so that the generation of statistical results can be given, which is a core part of this project, given that this, the psychologist will determine alternatives of channeling and attention for each case of detected student.

In the present article we attach information concerning the results obtained from the application of instruments, as well as advances in software development, this confirms the need to continue collaborating to care for young people with suicide vulnerabilities, and consider for this project stages future of continuity, where it can expand to a greater coverage of the student population, looking for a more transcendental social impact.

## 2. Materials and methods

### 2.1. Design and implementation of instruments

One of the essential and priority activities was the analysis of statistics from reliable sources such as: National Institute of Statistics and Geography (Inegi) in Mexico, as well as data obtained from studies in other countries, to know and confirm the reality of the indices. We worked on the evaluation of appropriate methodologies for software development, especially in incremental processes with continuous approach to the client. ([elfinanciero.com.mx/sociedad/la-tasa-de-suicidios-en-mexico-aumento-114-por-ciento-inegi.html](http://elfinanciero.com.mx/sociedad/la-tasa-de-suicidios-en-mexico-aumento-114-por-ciento-inegi.html), 2014)

Dentro del plan de trabajo se contempló el desarrollo de entrevistas a psicólogos, con la finalidad de confirmar información sobre los síntomas que presentan las personas suicidas y los principales motivos.

### 2.2 Normativity

Within the execution works reference was made to the IEEE 830 standard (Méndez, G. 2008) for the specification of requirements, aligning with this norm made it much easier to obtain well-detailed objectives to delimit times and pre-assignments of well-established roles. ([fdi.ucm.es/profesor/gmendez/docs/is0809/ieee830.pdf](http://fdi.ucm.es/profesor/gmendez/docs/is0809/ieee830.pdf), 2008)

### 2.3 Methodology

Stage 1. Design and development of instruments for the detection of suicide risk factors and information capture and contact-tracking software. For the development of this project has been considered the 1st Stage with a duration of 6 months, for this have been used and analyzed the methodologies and support standards and support for compliance with the guidelines that characterize and are demanding within In the area of software creation, derived from these analyzes, the following has been determined:

The visit and generation of agreements with candidate schools for the application of instruments and software piloting to obtain information, specification of software requirements and later the testing stage was scheduled. An essential part considered within the project is the design and development of instruments for the identification of factors, for which reference has been made to a document that studies the information related to the surveys, their types according to the purpose, the temporal dimension and the temporal sense. ([uam.es/personal\\_pdi/stmaria/jmurillo/...10/EN\\_CUESTA\\_Trabajo.pdf](http://uam.es/personal_pdi/stmaria/jmurillo/...10/EN_CUESTA_Trabajo.pdf), 2009).

Regarding the software development model, it was considered prototyping, which is a rapid design that focuses on a representation of those aspects of the software that are visible to the client or the end user. This design leads us to the construction of a prototype, which is evaluated by the client for a feedback in order to refine the software requirements. Maintaining a continuous interaction allows the prototype to be adjusted to satisfy the needs of the client and compliance with the requirements is achieved. This allows both parties to understand better what is necessary at the same time.

This model is considered very useful when it is clear what are the objectives of the project, therefore this will be used to explain it to the client and this opening to identify the detailed requirements of entry, processing and exit. ([ingenieriadesoftware.tumblr.com/post/17192998534/modelo-de-prototipos](http://ingenieriadesoftware.tumblr.com/post/17192998534/modelo-de-prototipos), 2008)

Based on the model in question, a better approach is offered than with other development models for this type of application, given that some elements of software development will be polished and modified, depending on the required functionality and feedback. Work with related activities, but independently allows us to integrate each of the advances under the same general objective. The revisions and corrections allow us to determine what is the result of the construction and when the requirements are satisfied. In this way, this particular life cycle involves the client more deeply at the time of using the product.

### **Purposes of the Prototype**

During the Analysis phase of the project and software development, the essential requirements have been validated, keeping the options of design, development and functionality tests of each component open.

This implies that we have considered the comments of the users, without losing attention to our objectives, it is essential to base ourselves on the previously obtained requirements, to generate and show the windows, their navigation, interaction, controls and buttons to the user. All this leads to obtain a feedback that allows us to improve the environment of the interfaces.

### **Development of the Database**

For the development of the database the determination has been made using PostgreSQL, for a series of characteristics that are considered below:

PostgreSQL is an object-relational database management system, distributed under BSD license and with its source code freely available. It is the most powerful open source database management system on the market. PostgreSQL uses a client / server model and uses multiprocesses instead of multithreading to guarantee the stability of the system. Its technical characteristics make this database manager one of the most powerful and robust in the market. PostgreSQL works very well with large amounts of data and a high concurrency of users accessing the system at the same time. ([mc2.net/es/postgresql-es](http://mc2.net/es/postgresql-es), 2016-2017)

### **Use of PHP**

Regarding the development and integration of code, we have opted for the use of PHP and we list several general characteristics that can support this decision.

PHP has a very large community of developers, there are thousands of places where you can find: documentation, tutorials, code samples, forums. Another point is that PHP has specialized libraries for certain jobs, which requires only knowing the syntax, and applying it or adapting it to the needs.

The performance of PHP is very efficient the cost of use of this license is free.

PHP was designed to work on the web for it brings a very broad set of functions to be used in different tasks related to the web, is available for most existing operating systems, from Unix, Linux, Microsoft Windows, MAC, among others.

PHP in its recent versions is designed to support object-oriented programming features. ([ardfreelance.com.ar/novedades\\_programador\\_php\\_freelance.php](http://ardfreelance.com.ar/novedades_programador_php_freelance.php), 2012)

Stage 2 Implementation of instruments and software, generation of statistics and workshop delivery.

This 2nd phase lasts for 6 months and includes one of the most important activities of the project, which is the implementation and piloting of the software, as well as obtaining statistics.

Reference is made to the use of an experimental methodology with 1 high school group and 1 high school group of 30-40 students each formed from a random and representative sample of students at the Secondary and Baccalaureate level in the municipality of Cuitláhuac, Veracruz. Currently we have identified that there is 1 general secondary with 30 groups from 1st to 3rd grade, 3 telesecundarias schools with 1 group of 1st, 2nd and 3rd grade respectively.

According to the above data we have about 1365 students from 1st to 3rd grade within the municipality at the secondary level, while at the baccalaureate level; There is a CETis institution with 13 groups of approximately 40 students on average and 1 private school with a high school level with 3 groups of approximately 15 students each. We consider 1 variable of ethnographic type, 2 socioeconomic variables and 1 academic variable related specifically to the rates of achievement of the students that make up the study population.

**Indicators**

Qualitative: Degree of self-esteem of young students to whom the instruments for measuring suicidal risk factors have been applied, Degree of internal security in the student.

Quantitative: Number of students attended through the application of measuring instruments and use of software for contact-monitoring, Number of students identified with suicide risk factors, Number of students channeled for attention.

In this experimental design, the test pilot process will last one semester, which includes the server configuration for the installation of software that allows access from the web, application of instruments, information capture and contact-tracking with young people. Subsequently, a series of activities will be developed, focused on concentrating statistics, and preparation and delivery of a workshop for the presentation of results and continuity of the project.

During the software implementation and piloting phase by the students of the designed software, the events that may occur during the process will be monitored. As they are understanding of the instructions of use of the software, functionality of elements, correct data in tracking statistics to each student, etc.

**3. Results**

Among the initial achievements is the specification of software requirements (ERS). Table 1 expresses the description of the student registry in the system, this function must be performed by the system administrator (who in this case may be the psychologist of the institution or who is in charge of tuteral duties). Table 2 indicates the authentication of students when entering the system. For the standardization of these requirements, a generic template has been used. Below are 2 of the 12 requirements as evidence of this process.

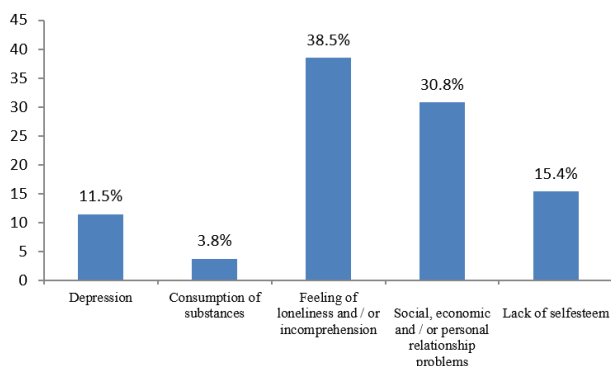
Requisition number	RF01		
Request name	Student Registry		
Type	Requirement <input checked="" type="checkbox"/>	Restriction <input type="checkbox"/>	
Source of the requirement	Client		
Characteristic	Students must be registered in the application to access their menu.		
Description of the requirement	The application must allow you, administrator, to register students. The administrator must enter data such as: Student ID, name, surname, date of birth, email, etc.		
Priority of the requirement	<input checked="" type="checkbox"/> High/ Essential	<input type="checkbox"/> Medium/ Desired	<input type="checkbox"/> Low/ Optional

**Table 1** ERS RF01: Student Registry  
*Source: Self Made*

Requisition number	RF02		
Request name	Students authentication		
Type	Requirement <input checked="" type="checkbox"/>	Restriction <input type="checkbox"/>	
Source of the requirement	Client		
Characteristic	Students must enter their username and password that has been registered in the system, to be able to access the application.		
Description of the requirement	Users can access the application and its menus, only if they are registered in it.		
Priority of the requirement	<input checked="" type="checkbox"/> High/ Essential	<input type="checkbox"/> Medium/ Desired	<input type="checkbox"/> Low/ Optional

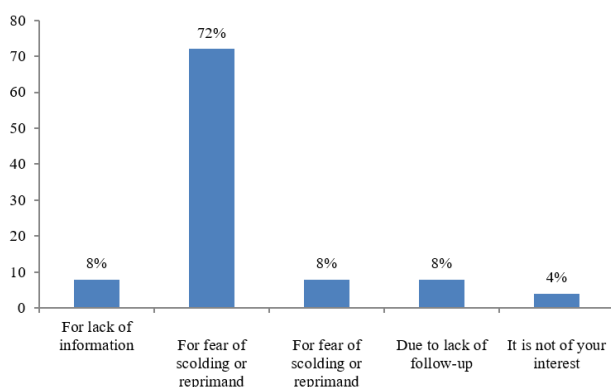
**Table 2** ERS RF02: Students authentication  
*Source: Self Made*

Another achievement obtained was having applied 1 of the instruments in a pilot group of 30 students of 1st grade of upper secondary education. Below is the graph 1 that is related to the 1st question and the graph 2, in relation to the 8th question of the instrument corresponding to students, where the opinion of this representative sample is expressed.



**Graphic 1** Question 1 of the student instrument What do you think is the main cause of suicide in young people and adolescents?

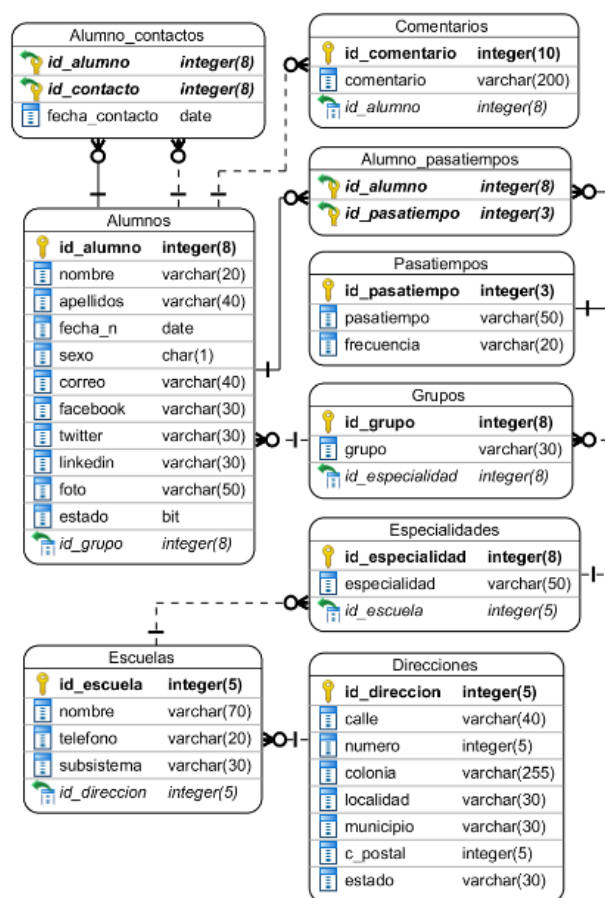
Source: Self Made



**Graphic 2** Question 8. Why do you think that most young people do not go to the right people or institutions when the idea of suicide passes through their head?

Source: Self Made

One of the expected and very important results is a database model, which allows us to establish information to be recorded and the relationship between it, to achieve this we used the Visual Paradigm tool, Figure 1, shows us a structure for the storage of information, it should be mentioned that this design is flexible and may have modifications. In this way, the following relational model has been defined:



**Figure 1** Relational Model of the Database

Source: Self Made

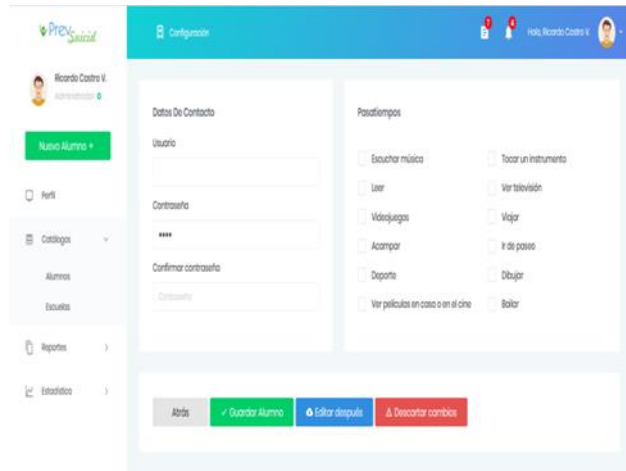
The works focused on the advances have allowed us to obtain several interfaces that are part of the essential structure of the project, for example figure 2 shows us the main page of the software administrator, which will allow to consult statistics, generate reports, enter the module of registration of students, and other functionalities.



**Figure 2** Main interface of software administration PreVsuicid of the project

Source: Self Made

Figure 3 shows the student registration interface, controlled by the administrator, this is where the user accounts for each student are generated.



**Figure 3** Student registration interface in the PrevSuicid software of the project  
Source: Self Made

#### 4. Acknowledgement

In a very special way we give thanks to the institution where we work for giving us the necessary support to develop the necessary works for this project. Thanks are given to the authorities and the psychologist of the pilot institution who kindly received us and contributed their experience and knowledge to enrich the contents, materials and instruments that were designed. This project is not yet funded by any institution, progress has been made thanks to the efforts of the work team.

#### 5. Conclusions

It has been a very important work to analyze statistics and consult psychologists to determine patterns that induce a behavior in young people, it is essential that mechanisms such as the present project are provided that help in the detection of suicide trigger symptoms. Among the achievements we can identify: The specification of software requirements, development of instruments to detect suicide factors, the development of UML artifacts, the modeling of the database and significant advances in software interfaces.

All the works programmed in this project have not yet been completed, the process of piloting the software, the graphing of contact-monitoring statistics and the evaluation of indicators is lacking, this will allow us to see reflected the impact that a software tool focused on totally to monitor information related to suicide symptoms may have. It has also been considered essential to expand the pilot population to have a greater diversity of study characteristics.

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