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RINOE Journal-Industrial Organization

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Presentation of Content

In the first article we present, *Product redesign to align with production processes*, by OJEDA-ESCOTO, Pedro Agustín, with ascription in the Universidad Tecnológica de Aguascalientes, as following article we present, *Causes of poor management of the safety and hygiene program and compliance with STPS regulations*, by RIVERA-CISNEROS, Miguel Ángel, RUIZ-ESPARZA-OCHOA, Sandra, MURILLO-SOTO, Sergio and RAMÍREZ-SILVA, Macario Alejandro, with ascription in the Universidad Tecnológica de León, as following article we present, *The digital profile that MSMEs need studied in generation z, for job immersion in industry 4.0*, by ESCUDER-AYALA Verónica, JARDÓN-SALAZAR, Ernesto and LÓPEZ-BARBERENA, Adriana, with affiliation at the Universidad Tecnológica de Léon, as last article we present, *Factors influencing the dropout of students at the Instituto Tecnológico Superior de Calkiní in the State of Campeche (ITESCAM). The case of the bachelor's educational program in administration*, by AVILA-ORTEGA, Jorge I., BACAB-SÁNCHEZ, José R., SANTOS-VALENCIA, Raúl A. and LÓPEZ-PONCE, María E., with secondment in the Instituto tecnológico superior de Calkiní.

Content

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Product redesign to align with production processes

Rediseño de producto para alinear con procesos de producción

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Abstract

The development of products destined to cover specific needs plays an important role when it is possible to have feedback, in terms of functionality, on the part of the final user for the consolidation of the product. Seeking such consolidation and identifying opportunities for improvement, in this paper a redesign was made based on specific criteria to align the manufacturing to mass production. The following premises were raised: 1) validation of the de-sign proposal; 2) comparative and operational analysis; 3) geometry optimization for weight and production cost reduction. This paper proposes a new design of the drawbar body of a tractor (case study) and the theoretical framework is established taking the bases of the concurrent engineering to define and characterize the final architecture configuration. Is reported the methodology used for the development of this research and the results obtained by finite element analysis for architecture optimization. Finally, are presented the defined strategies for aligning manufacturing to production.

Redesign, characterization, optimization

Resumen

El desarrollo de productos destinados a cubrir necesidades específicas juega un papel importante cuando es posible tener una retroalimentación, en términos de funcionalidad, por parte del usuario final para la consolidación del producto. Buscando dicha consolidación e identificando oportunidades de mejora, en este documento se ha realizado un rediseño basado en criterios específicos para alinear la fabricación a producción en serie. Se plantearon las siguientes premisas: 1) validación de la propuesta de diseño; 2) análisis comparativo y operacional; 3) optimización de la geometría para reducir el peso y los costos de producción. En el presente trabajo se propone un nuevo diseño del cuerpo de la barra de tracción de un tractor (caso de estudio) y se establece el marco teórico tomando las bases de la ingeniería concurrente para definir y caracterizar la configuración de la arquitectura final. Se reporta la metodología utilizada para el desarrollo de esta investigación y de los resultados obtenidos por el análisis de elementos finitos para la optimización de la arquitectura. Finalmente, se presentan las estrategias definidas para alinear la fabricación con la producción.

Rediseño, caracterización, optimización

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Introduction

Most structured methodologies to generate redesign seek to renew products from a particular approach, to mention a few: assembly, manufacturing, production, design for X. Taking traditional research as a starting point, in his work Pugh [1] presents a novelty of his Total Design Model to face the redesign. In this novelty, the specification of a product is established after having analyzed its concept, so it is used as a requirement to propose a variant solution. Some other design models are based on the execution and evaluation stages, or on the optimization of an initial alternative ([2], [3]).

Following this context, the initial solution option is evaluated and improved taking into account different aspects, such as: performance, cost, assembly, functionality, reliability, maintainability. Feedback is enforced, so the initial concept can be modified. Mostow [4] proposes a method to redesign, known as the repetition and modification paradigm. It consists of repeating a previous design process and modifying actions whenever necessary and possible according to the original design intent for new design specifications.

Studies by Han & Lee [5] and Howard et al. [6] define and treat redesign as a resolution of conflicts between current product needs and previous design capabilities; they also document that innovative products are only introduced when there are major conflicts between customer needs and existing products. On the other hand, Smith et al. [7] describe that there are many reasons to redesign a product and the design is usually derived from similar products; focusing their study on which redesign is an important part of the process of developing a new product.

One of the advantages of implementing redesign as a product development technique is being able to analyze not only design and assembly issues, but also strategies for planning and implementing proper disassembly of existing elements and subsystems. In the engineering context, disassembly may be defined as the use of assembly methods and configurations that allow for development of product cost-effective facilitates the separation of components and materials from used product to encourage recovery and reuse [8].

Disassembly is required for recycling, maintenance, remanufacturing, etc. Pertaining to remanufacturing, prioritization and protection of cores over nonremanufacturable parts are some aspects to be considered during the disassembly process [9].

This paper reports the procedure of the redesign done to the drawbar body of a tractor (case study). It also reports the results obtained from the finite element analysis made to that hitch to optimize its final architecture. Finally, defined strategies to align manufacturing to production are mentioned.

Theoretical Framework

The research presented in this paper is mainly based on the bases of Concurrent Engineering (CE) as regards technical processes. Some redesign perspectives were also taken into account in order to determine and define the final architecture of the coupling (case study). An overview of these issues is presented below.

Concurrent Engineering

The beginnings of Concurrent Engineering (CE) emerged from the aerospace industry, where all processes are governed by two main ideas: a) All components and elements of the final product must be considered from the earliest stages of design, and b) All the design activities preceding the achievement of the product must be taking place at the same time, i.e. they must be moving forward in the process simultaneously.

Once the CE is contextualized, which is currently closely related to the development of new products, it can be defined as the process of developing new products in which all areas must be involved, working accordingly in the creation of the product. Apart from being a mere work philosophy, CE involves a series of work techniques that allow to considerably shorten the development time of a product, allowing to reduce its costs, increase its quality and therefore, improve it.

According to Borja [10], there are several definitions of CE or also called in some research as Simultaneous Engineering (SE).

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There are some other definitions [11], but all of them agree that SE belongs to the design process and assigns parallel activities to decrease the product development time, improving its quality by integrating the product and its manufacturing process [12] (Figure 1).

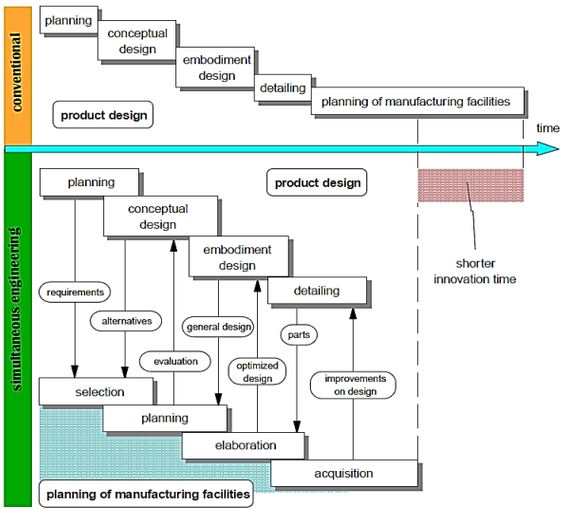

Figure 1 Simultaneous Engineering
Source: Borja [10]

According to Figure 1, the SE approach is to consider all aspects of the product life cycle as early as possible in the design process. The quality of products and its processes is improved because designs fulfil expectations of customers, are easy to produce and maintain. Important cost reductions can be achieved avoiding changes in the later stages of the design process and simplifying the production. And the lead time both for the design process (time to release a product to production) and to market (time to deliver the product to the customer) is shortened, due to parallel activities and the integration of the design of the product and its manufacturing process. Common problems that make it necessary to implement the CE in the design or redesign of a new product are:

– Increased product variety and technical complexity that prolongs the product development process and makes it difficult to predict the impact of design decisions on the functionality and performance of the final product.

– Increase the global competitive pressure resulting from the emerging concept of re-engineering.

– The need for a rapid response to changing consumer demand.

– The need for a shorter product life cycle.

– Large organisations with several departments working on the development of numerous products at the same time.

– New and innovative technologies that emerge at a very high rate, making the new product technologically obsolete in a short period of time.

Finally, some improvements to specific product lines through the application of concurrent engineering are:

– Optimization of development and production times.

– Quality system improvements.

– Improvements in engineering processes.

– Cost reduction.

Redesign Perspectives

Much of the design activity that companies have is concentrated on product re-design and usually a new product is a variation of the previous ones. Van Eldonk et al. [13] also add that it is not common to start the design of such a product from scratch, since companies make use of previous experience; to develop products that include functions and improvements, research and development is required and this also requires adjustments in manufacturing processes or the implementation of new ones.

Adam *et al.*, [14] synthesize some methods that can be used for the implementation of product redesign:

– One of them involves the use of reverse engineering techniques (making it very clear that reverse engineering is the opposite of advanced engineering). An existing product is taken and the corresponding CAD model is generated for modification or reproduction of the product disk design aspects. Reverse engineering is used to redesign a system to improve manufacturing or to produce a copy of the system without accessing the design from which it was originally produced.

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– Another path to redesign includes the integration of scanned images and drawings during the modelling process. These images serve as a guide to the designer when modelling the virtual object. In the end, the obtained configurations are used to improve the geometry of the new product.

– A further method is the disassembly of a product (or more) where the redesign is used to enhance certain features (new functions) in order to attach them to new components.

Research methodology, analysis and results

Designing is establishing and defining relevant solutions and structures, for problems that have not been solved before or new solutions proposed in a different way for problems that have previously been solved. Therefore, many designers argue that the only way to learn the artistic part of design is by designing.

Is also important to mention that many times it is required for the benefit of the advance of an investigation that they follow methodologies already defined or that they follow some variant based on those already mentioned. Figure 2 presents the methodology proposed for the development of this work.

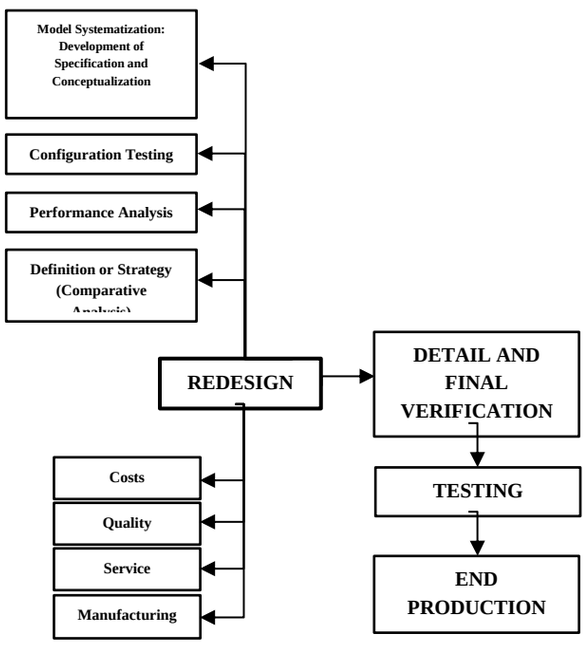

Figure 2 Research methodology
Source: Own production

Below is an overview of each of the stages of the methodology implemented:

– *Definition or Strategy (Comparative Analysis)*: Analysis carried out to define the new concept of the drawbar body.

– *Performance Analysis*: Definition of FEA analysis to locate the best redesign solution.

– *Configuration Testing*: Test stage for assembly and disassembly of components.

– *Model Systematization (Development of Specification and Conceptualization)*: Conceptualization of the final product architecture.

– *Costs*: Cost analysis in design and manufacturing stage.

– *Quality*: Analysis and implementation of quality in manufacturing processes.

– *Service*: Implementation of the necessary conditions for the application of manufacturing processes.

– *Manufacturing*: Implementation of manufacturing processes and continuous improvement.

– *DETAIL AND FINAL VERIFICATION*: Numerical analysis of FEA results and first stage of physical tests.

– TESTING: Second stage of physical testing under real operating conditions.

– *END PRODUCTION*: Alignment of product manufacturing to final production taking into account the strategies mentioned in section 3.4.

Case Study

The case study referred to in this article concerns the modification of the drawbar body of a tractor. This tractor is distributed in Mexico by a 100% Mexican company dedicated to offering integral solutions in the agricultural area.

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Proposition

In accordance with the requested requirement: increase the distance between the tow bar and the floor, several alternatives were proposed and reviewed to provide a solution to this requirement. Several ideas were conceptualized in which different changes were intended to be made, either partially or considerably.

Finally, it was decided to choose the one that avoids making very significant changes in the subassembly of the hitch. Figure 3 shows the final geometry proposed for the tractor pull modification.

Geometry optimization

Once the geometry was defined, finite element analyses were performed to corroborate or optimize (if required) the selected coupling geometry. These analyses also served to evaluate the weld and define the pro-posed application of the weld (Figure 4).

The mesh of the model was generated based on the dimensional relationships between the components of the assembly.

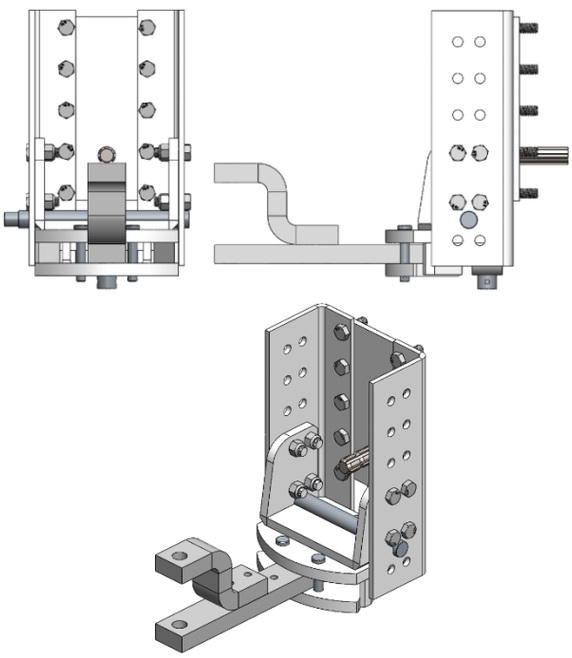

Figure 3 Modified coupler geometry
Source: Own production

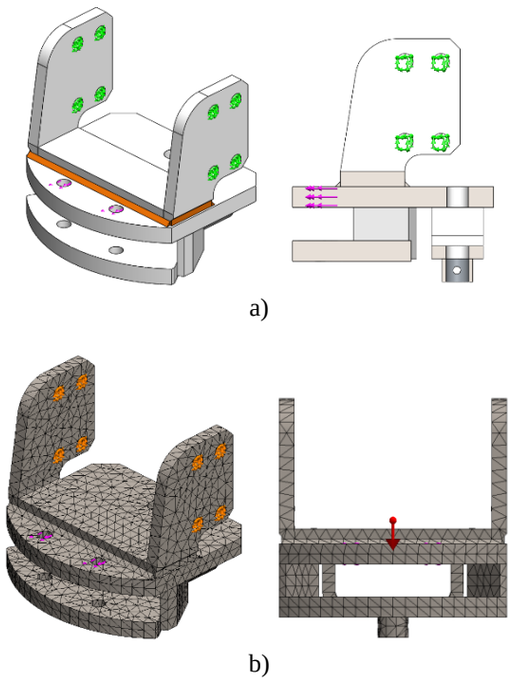

Figure 4 Application of border conditions: a) Model preparation, b) Model meshing
Source: Own production

The load conditions proposed for the analysis were determined based on the solicitations that are presented in the normal pull work exerted by the tractor. The load applied for the simulation of the tractor pull was of a magnitude of 9 tons.

Once the model had been characterized, a series of FEA analyses were carried out to evaluate the behavior of the elements that make up the assembly and how the applied welding would respond. Figure 5 shows the final geometry selection of the results obtained by finite element.

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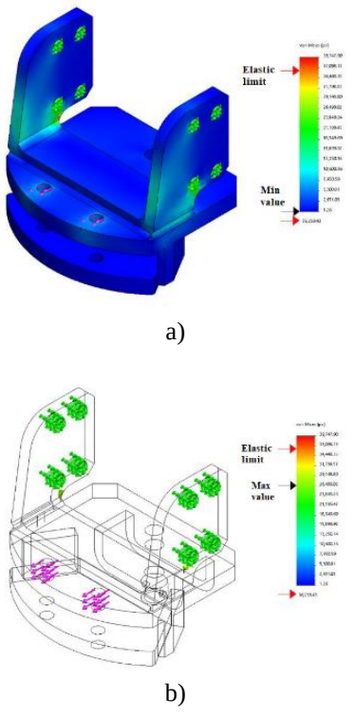

Figure 5 Stress analysis results: a) Elastic limit, b) Maximum stress value
Source: Own production

3.2 Results and Discussion

The stress study carried out on the modified coupling assembly shows that each and every one of the elements that make up the coupling has stress values below the permissible elastic limit of the material.

Figure 6 shows the result obtained from the finite element analysis applied to the new coupling proposal and taking into account the stresses presented on the pull bar attached to the coupling.

In the area where the coupling assembly surrounds the reinforcement bar of the external cylinder that supports the lift is where the highest magnitudes of efforts are presented presenting concentration of efforts in some points, this is due to the same geometry and conditions under which the elements of this part work.

Even so, these magnitudes are within the normal deformation ranges so that, for the time being, they can be neglected in order to continue with the manufacturing of the final assembly.

Finally, Figure 7a) shows the defined increase in the distance between the hitch bar and the ground and Figure 7b) shows the final assembly of the hitch on the corresponding tractor.

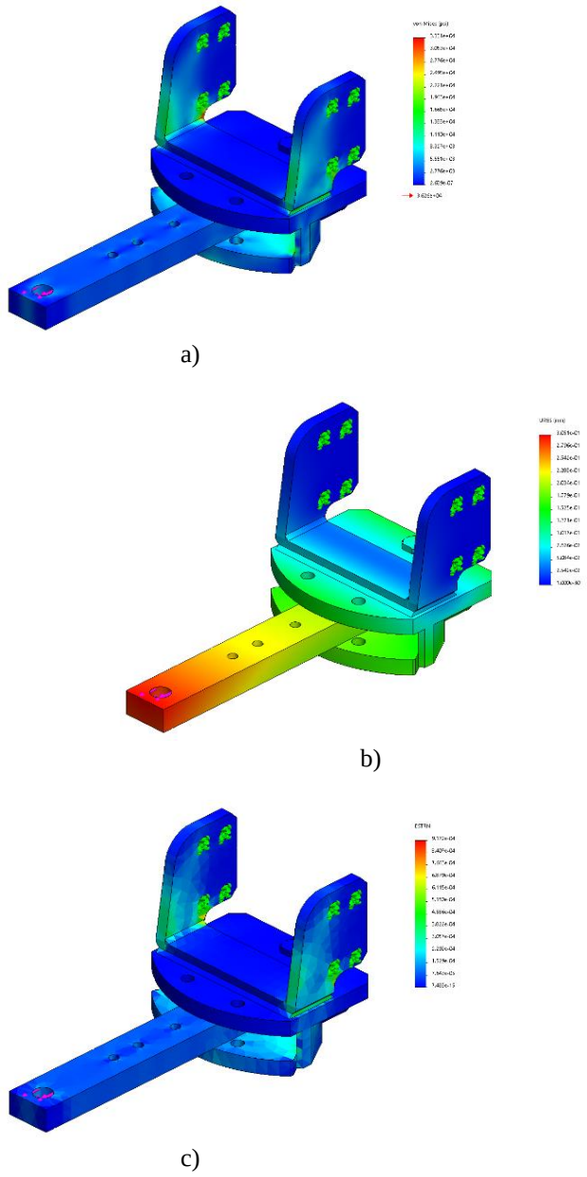

Figure 6 Results of the analysis with the drawbar attached to the hitch: a) Stress Analysis, b) Displacement Analysis, c) Unit Deformation Analysis
Source: Own production

3.3 Comparison of Original Solution and New Proposal

Figure 8 shows the results of the FEA analysis study carried out on the original geometry of the hitch, although the magnitudes of the stresses are below the elastic limit of the material, is possible to observe that the highest concentration is in the coupling plate of the tractor body. In the proposal chosen to implement the redesign of this coupling (Fig. 6), can be seen that, by changing the geometry of the coupling plate, stress concentrations decrease considerably.

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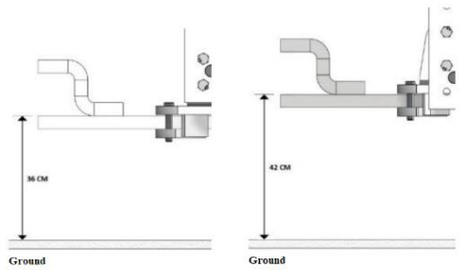

a)

b)

Figure 7 Final results: a) Distance between hitch bar and ground: original and modified pull, b) Final assembly on the tractor
Source: Own production

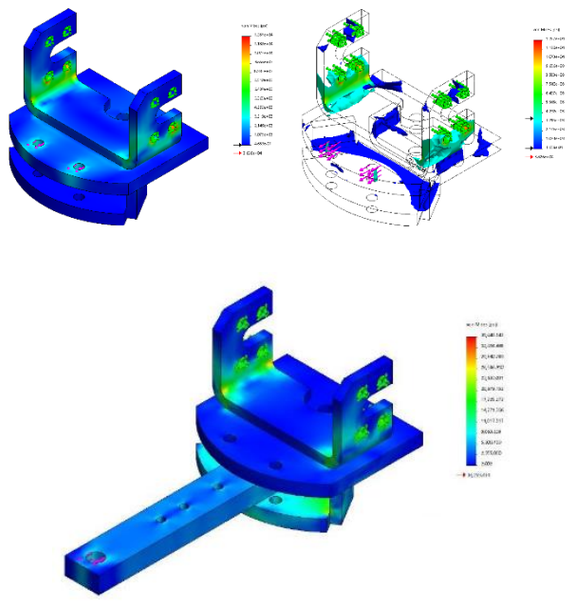

Figure 8 Stress analysis results of the original geometry and with the drawbar attached to the hitch
Source: Own production

Based on the results obtained from the finite element analysis of the geometries (existing and selected for new proposal), the value is increased to the argument that the new geometry will have better response to the tractor working loads and therefore a plus is added to the technical specification.

Is also important to comment that these results served as the basis for generating the alignment strategies for manufacturing and production.

Strategies for production alignment

Once the new architecture of the coupling was defined and the tests of the product concept were carried out, the following strategies were defined to align it to production, taking into account product image and marketing (due to confidentiality issues of the company, these strategies are mentioned in a very global way) (Figure 9).

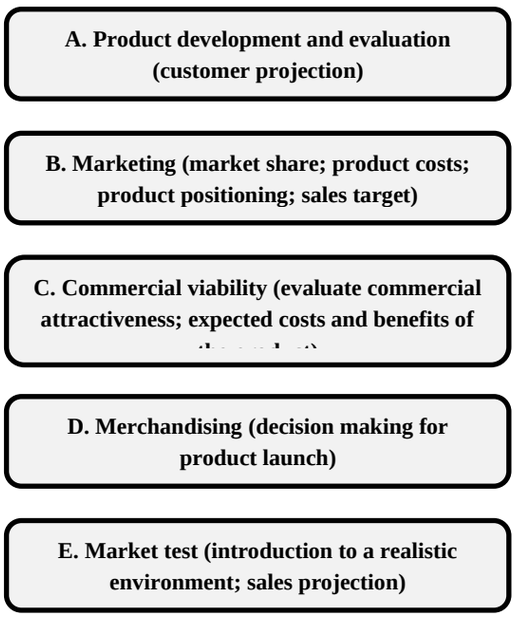

Figure 9 Strategies for alignment to production
Source: Own production

The strategies mentioned above together with the defined manufacturing processes, complemented the final line for the generation of different families of couplings according to each of the existing tractor models.

Finally, a successful sales scenario was obtained for these couplings based on the experimental and engineering results applied in this research.

Conclusions

Advances in computer and technology analysis allow engineers and researchers to have effective diagnostic and simulation tools that facilitate, at any given time, the design, redesign or optimization of a mechanical system.

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The development and implementation of methodologies for the design or redesign of products based on new technologies, increases the probability of market alignment and the increase of knowledge and technology transfer to the industrial sector.

Designing is establishing and defining relevant solutions and structures, for problems that have not been solved before or new solutions posed differently for problems that have been previously solved.

In this paper, the configuration of a tractor's hitch body and the results of the finite element analysis were presented as a case study that helped to define a redesign of the final architecture of that hitch. Finally, some defined strategies were listed for the alignment of the new product developed to production, taking into account sales projections, product image and marketing.

Acknowledgment

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Causes of poor management of the safety and hygiene program and compliance with STPS regulations

Causas de la deficiente gestión del programa de seguridad e higiene y la atención a la normatividad de la STPS.

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Abstract

This article presents results of the investigation that was applied to 17 companies in the city of León Guanajuato that requested support to establish the Safety and Hygiene plan in their organizations, its purpose is to identify the causes of poor management of the safety and hygiene program and attention to the regulations of the Ministry of Labor and Social Welfare (STPS). To carry out the investigation, information was collected through checklists in accordance with the STPS Official Mexican Standards (NOM), analysis tools were applied to identify the problem and a table was prepared to explain the causes. The result of the investigation revealed the main causes of the deficient management of the safety and hygiene program and compliance with the STPS regulations.

Management, Safety, Hygiene, Regulations, STPS

Resumen

En el presente artículo se presentan resultados de la investigación que se aplicó a 17 empresas de la ciudad de León Guanajuato que solicitaron apoyo para establecer en sus organizaciones el plan de Seguridad e higiene, tiene como propósito la identificación de las causas de la deficiente gestión del programa de seguridad e higiene y la atención a la normatividad de la Secretaría de Trabajo y Previsión Social (STPS). Para llevar a cabo la investigación, se recopilo información mediante listas de verificación en conformidad con las Normas Oficiales Mexicanas (NOM) de la STPS, se aplicaron herramientas de análisis para identificar la problemática y se elaboró una tabla para explicar las causas. El resultado de la investigación arrojo las principales causas de la deficiente gestión del programa de seguridad e higiene y atención a la normatividad de la STPS.

Gestión, Seguridad, Higiene, Normatividad, STPS

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Introduction

The issue of occupational safety and hygiene is of utmost importance for organizations, since currently given the complexity of the processes, if preventive measures are not established in the risks of accidents and occupational diseases, the consequences can be very serious, especially all for the workers since all activity in companies carries risks. In accordance with the foregoing, it is possible to observe the importance of this investigation, which aims to identify the causes of poor management in companies to implement safety and hygiene programs and meet the obligation to comply with the Official Mexican Standards (NOM) of the Ministry and Labor and Social Security (STPS). This problem was identified in 17 companies in the city of León, Gto., Which requested support to carry out the safety and hygiene plan, of which 12 were industrial companies, and of these 11 were footwear manufacturers and 1 was a manufacturer of automotive parts, 3 service companies and 2 commercials.

Justification Health at work is very important, According to (Arias & Heredia, 2009, p. 665) referring to the World Health Organization, as "a complete state of physical, mental and social well-being, to achieve full development of the human faculties "continue to cite the same authors that according to article 25 of the Universal Declaration of Human Rights" Everyone has the right to an adequate standard of living that ensures, as well as their family, health and well-being "(Arias & Heredia, 2009, p. 665) and within work it is very important, since the worker is motivated by feeling safe and therefore potentiates their human skills at the service of organizations, hence the importance of establishing and implement Safety and hygiene in the work area. In accordance with the foregoing, it can be identified that there are organizations at the international level, such as the International Labor Organization (ILO) that proposes safety and hygiene measures for workers, thus establishing Human Rights principles, which countries should follow. to have a full development of social welfare.

For some authors "Mexico, as a country in the process of industrialization, is not alien to the implications that the production of goods and services and their usufruct brings with it, among which the accident rate is located in the various areas in which the human being operates "(Arias & Heredia, 2009, p. 668).

It is necessary to consider it important that the Organizations establish adequate management, in order to coordinate efforts in favor of implementing the Safety and Hygiene program, in addition that this issue is of special interest since according to the LFT, article 475 Bis is cites that "The employer is responsible for safety and hygiene and the prevention of workplace risks in accordance with the provisions of the Law, its regulations and official Mexican standards" (Instituto Superior de Estudios Fiscales AC, 2014, p. 128).

Occupational safety and hygiene are tactics and strategies that are implemented within the organization, to reduce the risks of work due to accidents or occupational diseases, which has the purpose of procuring the care of workers, as well as generating health in the workplace. productive environment, so it is important to identify the importance of establishing a culture of prevention and thus preserve workers in optimal health conditions, so the managers of the organizations must implement Safety and Hygiene programs according to the needs protection of workers, also generating adequate awareness.

Method description

Quantitative Method, Research Design. It is a non-experimental method: Because you do not have control of the variables. Transversal: Because it took place in a single moment. Type of Research: Descriptive: Descriptive statistics were used. Research techniques: The record of measurements was carried out as follows:

- Checklist in accordance with the requirements of the NOM.
- Structured questionnaire: Applying the technique of the interview and the observation of the questionnaire. The way of carrying out the registration was in accordance with what is specified in ISO19011, guide for audits of the quality, environmental, safety and hygiene and information management system, where a comparison is made with the requirements of the NOM and the evidence of performance compliance, with two types of results, Conformity, Non-Conformity.

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- For the analysis of the information, the causes and the problem are identified in an Ishikawa diagram, as well as a Pareto diagram to identify the 80/20 principle.

- To identify the causes, an explanatory table of relationship of requirement with the cause was used.

Performance Evaluation Method: Graphical rating scale method, focus on traits for performance evaluation where the management process is rated based on a scale of characteristics. (Bohlander & Snell, 2009, p. 365).

The Universe object of study of this document are all the companies of the Municipality of León, Guanajuato, that require to establish and implement the occupational safety and hygiene program. The population under study in this document are 17 companies that requested advice, which had the need to establish and implement occupational safety and hygiene and meet the regulations of the STPS. The sample under study to represent the sequence of activities to document this document is from the companies that requested advice.

Work Hypothesis: H1: The lack of a culture of prevention of work risks and the ignorance of the application of the STPS regulations, are the causes that have as a consequence the deficient management in the implementation of the occupational safety and hygiene program and attention to the regulations of the STPS.

Null Hypothesis: H0: The lack of a culture of prevention of occupational risks and the lack of knowledge of the application of the STPS regulations are not causes that result in poor management in the implementation of the occupational safety and hygiene program and attention to STPS regulations.

Development

The results of the Investigation were the following:

1) From Methodological Objective 1 Request and Gather Information to identify variables.

a) Managers and those in charge of the departments who would carry out the observation tour were asked, to identify the variables of the work risks, they were told that they will carry out their activities in a normal way, as they always do, all of them They agreed, the information could be collected without any problem.

b) Design of Measurement Instruments:

- ✓ The design of the checklist was made in accordance with the requirements of the standards: NOM001_STPS_2008 Safety in Buildings, Grounds, Work Center areas, NOM002_STPS_2010 Prevention and Fire Fighting and NOM004_STPS_2010 Safety Devices in Machinery and Equipment; and its specific references NOM017_STPS_2010 Personal Protective Equipment and NOM026STPS, Colors and signs.
- ✓ The Questionnaire List was prepared to identify the way to carry out the Management for the Implementation of the Safety and Hygiene Program and attention to the regulations of the STPS.

c) Compilation of information in the workplace, with the Observation technique, in accordance with the requirements of the NOM's, recorded in the checklist, identifying the compliance and non-compliance.

It was observed in the tour inside the company that risks were found, as presented in the Checklist, which is detailed below:

- 49 Conformities, that is, of the requirements requested by the standards applied according to the context of the company, in 49 requirements the company does comply.

- 43 Non-conformities, that is, it does not meet the 43 requirements established by the aforementioned standards.

According to the above, it can be identified that, of the revised requirements, 53.26% do comply and 46. 74% do not comply, it is important to identify that the percentages of non-compliance are very high, since the company must comply with 100% as established by the regulations in each of the STPS NOMs, since the fact that there are identifiable risks, each of the requirements that the company does not comply with would generate accidents and diseases on a large scale, due to the potentiality of each risk marked as non-compliance in the work area.

d) Compilation of the information from the questionnaire on how to carry out Management in the organization, with the Interview technique, through the objective registration of the information.

According to the questions made to those in charge of carrying out the Safety and Hygiene program and the attention to the STPS regulations, the percentage of compliance is represented according to the table, identifying the degree to which it complies and it was found that in companies:

– It is identified that the objectives are not specific, measurable, achievable, realistic and specify the time that must be met, also they do not have plans such as programs, procedures, budgets and documented regulations to achieve them, they do not take into account the regulations.

– The company does not comply with the documented organization formalized in organization charts, position profile, defined procedures, they do not have brigades to attend to emergencies, the staff has no specific tasks and they do not have resources to attend to Safety and Hygiene in the workplace.

– They did not show that there is effective supervision to carry out the tasks in accordance with the Health and Safety Plan; There is no intra-organizational communication to publicize the plan and meet the STPS requirements; there is no documented intra-organizational communication in writing when there are work risks, incidents and accidents for your attention; there is no motivation on the part of the coordinator to implement the regulations and attend the safety and hygiene plan; They do not have technical skills, how to apply the regulations and implement the health and safety plan.

– It does not have defined indicators to identify compliance with the health and safety plan and compliance with regulations; It does not have measurement instruments, to be able to measure the processes of the plan and compliance with the STPS regulations; It does not have time standards that measure performance according to the indicators, which are adequate to make effective decisions; they do not perform the analysis of the results that the performance measurement yields and take them as a basis for decision making; They do not carry out improvement, corrective and preventive actions, providing feedback on the processes to implement the Health and Safety plan and Attention to the STPS regulations.

2) From the methodological objective 2. Analysis and Identification of the problem.

a) In the analysis and identification of the problem and the causes that generate it, the Ishikawa diagram was used, it was analyzed and identified that:

The problem is that there is a deficient management to implement the program of safety and hygiene and attention to the NOM's of the STPS;

When carrying out the analysis of the causes, the non-conformities were taken as a basis by extracting the non-conformities to the NOM's, classifying them by problem stratum, identifying that the main causes are classified into 5 strata and that of the classification of non-conformities. compliance was identified that: There is ignorance in the application of the NOM's of the STPS, with 19 requirements that for this reason are not met. Being the biggest cause; There is a need for a culture of prevention of occupational risks, with 12 requirements that for this reason are not met; Regarding the lack of communication to implement the program, it was identified that there are 8 requirements for this reason that are not met; There is a lack of resources to implement the safety and hygiene program, it was found that there are 3 requirements that are not met with this cause; The lack of sanctions to avoid risks, 1 requirements are not met for this reason.

Ishikawa Diagram, Methodology of the Stratification or Enumeration of Causes Technique. (Gutiérrez Pulido, 2010, p. 197)

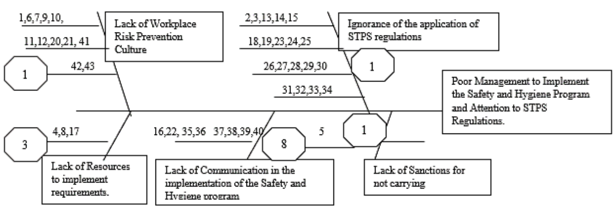

Figure 1

No.	NOM		Requirement	Requirement	Stratification	No.	NOM	No. Requirement	Requirement	Stratification
1	1		5.1	Preserve conditions	Culture	23	2	6.5	EPP Instructions	Unawareness
2	1		5,2	Eye checks	Unawareness	24	2	6.6	Brigades vs. Fire	Unawareness
3	1		5.3	Checks after Ev	Unawareness	25	2	6.7	Drills participate	Unawareness
4	1		5.5	Decontamination showers	F. Resources	26	2	7.2	Annual Fire Extinguishers Program	Unawareness
5	1		6.2	Worked. receive Inf conservation.	Missing Sanctions	27	2	7.3	Fire extinguisher review record	Unawareness
6	1		6.3	Worked. involved conservation.	Culture	28	2	7.5	Inst. Revision prog. Electrical	Unawareness
7	1		7.1.1.	Order and Cleanliness	Culture	29	2	7.6	Prog Gas installation	Unawareness
8	1		7.13	Disabled adequate M.A	F. Resources	30	2	7.7	Program records	Unawareness
9	1		7.15	Purpose use structures	Culture	31	2	9.1	# brigade members	Unawareness
10	1		9.2	Traffic signage	Culture	32	2	10.1	Drills, signage	Unawareness
11	1		9.8	Operations c. download block	Culture	33	2	10.2	Planning Drills	Unawareness
12	2		5.3	Security instructions	Culture	34	2	10.3	Drills Registration	Unawareness
13	2		5.5	Emergency plans	Unawareness	35	2	11.1	Fire prevention training	Communication
14	2		5.6	Brigade Skills	Unawareness	36	2	11.2	Training workers	Communication
15	2		5.7	Drills	Unawareness	37	2	11.3	Trained brigadiers	Communication
16	2		5.8	Fire Training Program.	Communication	38	2	11.4	Head of brigades,	Communication
17	2		5.9	Sufficient PPE	F. Resources	39	2	11.5	Annual training program	Communication
18	2		5.10	High risk fire areas	Unawareness	40	4	5.1	Maq Prevention Training	Communication
19	2		5.11	Documentation, minutes, opinion	Unawareness	41	4	6.3	They report flaws in Maq	Culture
20	2		6.1	Instructions are followed	Culture	42	4	6.4	EPP use in Maq. and EQ.	Culture
21	2		6.2	Prevention measures continue	Culture	43	4	6.5	Wear short hair, no chains, rings	Culture
22	2		6.3	Worker training	Communication				EPP Instructions	

Table 1

b) In the analysis and identification of the problem and the causes that generate it, using the 80/20 principle, to find the causal variables that cause the greatest number of problems, using the Pareto diagram, it was found that:

– In the lack of knowledge in the application of the NOM's of the STPS, the 19 requirements represent 44.19% and in the lack of a culture of prevention of work risks, the 12 requirements represent 27.91% and together according to the principle of Pareto, they represent 72.1% of the problems, so it can be identified that according to the stratification they are the main causes of the deficient management to implement the safety and hygiene program and meet the NOM's of the STPS. Pareto Chart: Analysis of the 80/20 principle of the causes of poor Management to implement the Health and Safety program. (Gutiérrez Pulido, 2010, p. 179)

Cause	Frequency	Accumulated Frequency	Percentage	Accumulated percentage
Ignorance of regulations	19	19	44.19	44.19
Risk Prevention Culture	12	31	27.91	72.1
Lack of communication	8	39	18.60	90.7
Lack of resources	3	42	6.98	97.68
Lack of Sanctions	1	43	2.32	100

Table 2

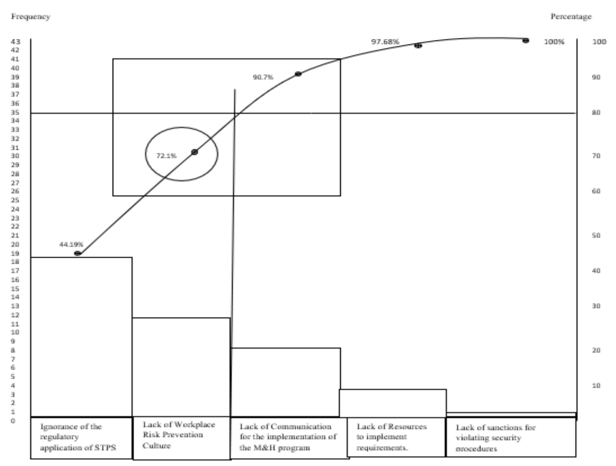

Figure 2

From the Methodological Objective 3. Definition and explanation of the causes of the deficient management to implement the Safety and Hygiene program and attention to the NOM's of the STPS.

a) The table was designed to identify the requirements and their explanation of the causes, identifying the NOM requirement, which they did not comply with, the interpretation, the analysis of the expected / desired and the gap / difference.

Definition and Explanation of Causes by Stratum.

No	Requirement	Stratification	Interpretation NOM 001 STPS	Expected / Desired	Gap / Difference
5.1	Preserve conditions	Culture	Workers do not keep work areas neat, clean	Workers must keep work areas in orderly, clean condition	The lack of culture in the prevention of risks in the work areas can cause various accidents
5,2	Eye checks	Unawareness	When applying for registration, they had no knowledge of the rule.	The company has evidence that work risks are verified in the work areas	The lack of knowledge that the company has to have evidence of the verifications, to generate improvements in prevention
5.3	Checks after Events	Unawareness	Managers were unaware, demonstrated factor check record, After accidents occur	The company must have verification evidence after accidents occur, to prevent risks.	The lack of knowledge to follow up when incident / accident events occur, with documented eye checks, does not allow to follow up on improvements
5.5	Decontaminatio n showers	F. Resources	Decontaminatio n showers must be established, the company does not have it due to lack of resources	The company must have resources, to have the security conditions established by the regulations	The lack of resources for risk prevention are factors for optimal performance in the Safety and Hygiene program.
6.2	Worked. receive Inf conservation.	Penalties missing	Information on the conservation of work areas is provided, no sanctions are established for those who do not comply	That the workers comply with the information requirements.	By not following the indications to keep work areas in optimal conditions, workers are risk factors for accidents.
6.3	Worked. involved conservation.	Culture	Workers do not participate in the maintenance of order and cleanliness in the work area	Workers must comply with the requirement of keeping the workplace in order and clean	When workers do not comply, they fail to identify the risks that they may suffer accidents, a culture of risk prevention is needed.
7.1.1 .	Order and Cleanliness	Culture	The requirement calls for the place to be neat and clean	The work areas of the company must be clean and orderly.	The lack of a culture of prevention of risks of the workers does not allow that it is observed that the requirements are fulfilled.
7.13	Disabled adequate M.A	F. Resources	The company does not have a suitable environment for the transfer of the disabled	The company has the resources to prepare the spaces for the transfer of the disabled	The company does not have the resources to condition the environment for the disabled, it affects the program and regulations.
7.15	Purpose use structures	Culture	They do not use it for the proposed purposes of the structures, such as stairs, corridors, on the walls, sometimes there is material	Adequate use must be given to the structures inside, generating more order in the places intended for it.	The interior structures are not properly used, due to the lack of a culture of order in the prevention of risks.
9.2	Traffic signage	Culture	They do not follow the signs for the way of traveling	Workers must follow the signs for transfers	Workers do not follow the signs of the place, for lack of a culture of risk prevention.
9.8	Operations c. download block	Culture	The loading and unloading operations, the vehicles are not blocked, so that the tires do not move	It must establish prevention in vehicle loading and unloading operations	Tires are not blocked in loading and unloading operations, they are risk factors, due to the lack of a culture of prevention.
			NOM 002 STPS 2010		
5.3	Security instructions	Culture	Workers do not follow safety instructions, they stop doing it because they produce more	Workers must follow safety instructions, not just at times, or when they feel watched	Workers do not follow instructions, only in moments, such as the use of PPE, order, cleanliness, due to a lack of prevention culture
5.5	Emergency plans	Unawareness	The company does not have documented emergency plans according to its context, due to lack of knowledge	The company must establish the emergency plans in writing, according to the context of the company.	Due to lack of knowledge, the company is not aware that the emergency plans must be in accordance with its context.
5.6	Brigade Skills	Unawareness	It was not known that skills have to be developed to be part of the brigades.	The company must train workers so that they have the skills to be part of the brigades	The lack of knowledge of the application of regulations, of training workers to develop skills of the brigades.
5.7	Drills	Unawareness	You do not have the knowledge to apply drills	Drills must be conducted	There is no knowledge of how to apply drills.
5.8	Fire Training Program	Communicatio n	Communication failures due to lack of training to prevent fires	There must be training to prevent risks	Communicatio n failures in the lack of training in how to prevent risks.
5.9	Sufficient PPE	F. Resources	It was identified that there is not enough Personal Protective Equipment	There must be PPE, enough for employees	Lack of Resources to have PPE
5.10	High risk fire areas	Unawareness	High risk areas are not identified, security measures are not kept	High fire risk areas should be identified and preventive measures saved	Lack of knowledge of identifying high fire risk areas, in order to exercise safety precautions.
5.11	Documentation, minutes, opinion	Unawareness	The company did not have documentation of the fire risk observation tours	The company must have documentation , such as travel records, as well as the compliance report	Lack of knowledge to document fire risk observation tours in minutes and apply improvement actions
6.1	Instructions are followed	Culture	The company must ensure that the fire prevention instructions are followed	The company must ensure compliance with the safety instructions to prevent fires	The lack of culture to ensure that fire prevention instructions are followed.
6.2	Prevention measures continue	Culture	The company must ensure that the fire prevention instructions are followed	The company must ensure compliance with the safety instructions to prevent fires	The lack of culture to ensure that fire prevention instructions are followed.
6.3	Worker training	Communicatio n	The company does not train the worker in fire prevention and fighting	The company must train (communicate), the measures to fight and prevent fires	The company must train the worker, The lack of communicatio n formalized in a training to prevent fires.
6.5	EPP Instructions	Unawareness	The company does not give instructions on how to use the PPE	The company must demonstrate that it gives instructions on how to use PPE	The company does not have knowledge that it must demonstrate by instructions, how to use PPE
6.6	Brigades vs. Fire	Unawareness	There was no knowledge of the activities carried out by the fire brigades	The brigades must carry out activities before, during and after a fire	The company was not aware of the activities carried out by the brigades before, during and after a fire.
6.7	Drills participate	Unawareness	No drills are conducted	They should conduct drills involving workers	It was not known that drills should be conducted involving all workers.
7.2	Annual Fire Extinguishers Program	Unawareness	There is no annual fire extinguisher program, some expired	The company must have an annual fire extinguisher maintenance program	It was not known that there should be an annual fire extinguisher maintenance program.

7.3	Fire extinguisher review record	Unawareness	No fire extinguisher service record is kept	A fire extinguisher inspection record must be kept	There was no knowledge of keeping a fire extinguisher inspection log.
7.5	Inst review program Electrical	Unawareness	There is no annual inspection program for electrical installations	A revision program of electrical installations must be carried out	It was not known to carry out the annual electrical installation inspection program.
7.6	Prog Gas installation	Unawareness	No fire extinguisher service record is kept	A fire extinguisher inspection record must be kept	There was no knowledge of keeping a fire extinguisher inspection log.
7.7	Program records	Unawareness	No fire extinguisher service record is kept	A fire extinguisher inspection record must be kept	There was no knowledge of keeping a fire extinguisher inspection log.
9.1	# brigade members	Unawareness	Depending on the context, the number of members of each brigade must be decided	The number of members of the brigade must be decided, according to the context	There was no knowledge of making the decision on the number of members of the brigade, according to the context of the company.
10.1	Drills, signage	Unawareness	There was no knowledge of the drills, which also have to be marked, since the people who knew are no longer present	There must be drills, in addition to signage to carry them out.	There is no knowledge of how to carry out drills and signaling
10.2	Planning Drills	Unawareness	There is no planning for drills	Drills should be planned	It was not known that there must be planning to carry out drills
10.3	Drills Registration	Unawareness	No drill log	You must make a record of drills	It was not known that a record of drills should be kept.
11.1	Fire prevention training	Communicatio n	The personnel are not trained to prevent fires, the personnel were no longer there.	The way to prevent fires must be communicated , formalized in constant training	The way to prevent fires is not communicated , formalized in a training
11.2	Training workers	Communicatio n	Staff are not constantly trained to prevent fires.	The way to prevent fires must be communicated , formalized in constant training	The way to prevent fires is not communicated , formalized in constant training.
11.3	Trained brigadiers	Communicatio n	Brigadistas are not trained, because they no longer work in the company	The way to prevent fires must be communicated to brigade members, formalized in constant training	The way to prevent fires is not communicated , formalized in a training to a team of brigade members.
11.4	Head of brigades, trained	Communicatio n	The person in charge of brigadistas is not trained, because he no longer works in the company	The way to prevent fires must be communicated , formalized in constant training to a brigade manager.	The way to prevent fires is not communicated , formalized in a training to a head of brigades and to train him
11.5	Annual training program	Communicatio n	There is no annual fire prevention training program	The way to prevent fires must be communicated , formalized in an annual training program	The way to prevent fires is not communicated , formalized in an annual training program
			STANDARD 004 STPS		
5.1	Machinery Prevention Training	Communicatio n	There is no training in risk prevention in machinery	There must be training in risk prevention in machinery	There is no communicatio n of risk prevention in the use of machinery, formalized in a training
6.3	They report flaws in Maq	Culture	They are not reported when there are defects in machinery	They must be reported when there are defects in machinery	Lack of culture to report and prevent risks when there are defects in machinery.
6.4	EPP use in Maq. and EQ.	Culture	Personal Protective Equipment is not used in the handling of machinery and equipment	PPE must be used when using machinery and equipment	Lack of culture of use of Personal Protective Equipment, when machinery and equipment are being used
6.5	Wear short hair, no chains, rings	Culture	Some people did not have short hair, they use chains and rings in risky processes	Short hair should be used, do not use chains and rings, especially in risky processes	The lack of culture of the personnel to prevent risks of accidents, not to wear short hair, not to use chains and rings.

Table 3 Definition and explanation of causes by Stratum
Source: Own elaboration

Conclusions

1. The causes that caused the deficient management to implement the safety and hygiene program and attention to regulations, is the ignorance of the application of the STPS regulations in the first place and in the second place the lack of a culture of prevention of occupational risks, being 72.1% of causes that cause the greater amount of problems.

2. It is very important that those in charge identify the type of NOM of the STPS according to the context of the company and apply the legal requirements that are stipulated in it, referring to the Legal Framework where standards related to Safety are identified for prevention of accidents, norms referring to Hygiene for the prevention of occupational diseases.

3. It agrees with the author Robbins (2004, p. 254) who asserts that culture is a "System of meanings shared by the members of the Organization, which distinguish it from others" and the author continues to cite that there are 7 characteristics to develop the Culture in the prevention of work risks, of which it is considered that: a) Innovate and take risks, to Implement Safety and Hygiene: Degree to which employees are encouraged to be innovative and take risks in the implementation of safety and hygiene; b) Thoroughness in implementing the Health and Safety program: Extent to which employees are expected to show accuracy, analytical skills and attention to detail; c) Orientation to the results of the Safety and Hygiene program: Degree to which management focuses on results; d) Orientation to people. Degree to which management decisions take into account the effect of the results on the members of the organization; e) Orientation to the teams. Degree to which work activities are organized in teams rather than individually; f) Aggressiveness to apply the safety and hygiene program: Degree to which people are daring and competitive, rather than carefree; g) Stability. Degree to which the activities of the organization maintain the state of safety and hygiene.

4.- It is important that administrators must have the skills and competencies, in any of their areas of responsibility, to be successful and to achieve the goals of the organizations. The author Chiavenato (2008, p. 143) agrees that the administrator must have skills to carry out adequate management in: - Planning of the safety and hygiene program, appropriate to the context of the company, Adequate organization for the implementation of the program , Management Skills in the management for the implementation of Safety and Hygiene and attention to the regulations of the STPS, Adequate control to measure and provide feedback on the process of implementation of the Plan and attention to regulations.

5. It is important to follow research methods, analysis, start-up, to implement security measures in companies, as mentioned by the author (Lisa, 1999, p. 24) that it is important to have identified a model and establish planning suitable for its execution and corresponding improvement actions, hence the importance of approaching methodological models for its use.

6. It is relevant that an improvement plan be drawn up taking care of the gaps in which there is a discrepancy and making the best effort with responsibility between being and should be to achieve the objectives set regarding what is.

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The digital profile that MSMEs need studied in generation z, for job immersion in industry 4.0

El perfil digital que necesitan las Mipymes, estudiado en la generación z, para la inmersión laboral en la industria 4.0

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Abstract

The objective of this research was to find the digital profile that MSMEs need in generation z, for their work immersion in industry 4.0. The main contribution was to identify the digital profiles that are required in MSMEs, preparing a description of what youn people of generation Z are like today and what are their possibilities of immersion in industry 4.0. The methodology used was qualitative though focus groups to entrepreneurs and young people of generation z. The dimensions used were taken from the theory of García Ávila (2017) and Epstein, Nisbet and Gillespie (2011). Five dimensions were worked on and an interpretation was made through hermeneutics and with a comparative analysis of interpretation, polarization and word cloud to from the research results. In the analysis obtained, it was noted that there is a new awareness of the use of technology despite the real failures of the country's telecommunications. The digital use of generation z is imminent, but its resources and use are not adequate for a proper work immersion. In general, there is a lack of total planning in the use of technologies and their potential.

Industry 4.0, Digital profiles, MSMEs

Resumen

El objetivo de esta investigación fue encontrar el perfil digital que necesitan las Mipymes, en la generación z, para su inmersión laboral en la industria 4.0. La principal aportación fue identificar los perfiles digitales que se requieren en las empresas Mipymes elaborando una descripción de cómo son actualmente los jóvenes de la generación z y cuáles son sus posibilidades de inmersión en la industria 4.0. La metodología usada fue cualitativa a través de focus groups a empresarios y a jóvenes de la generación z. Las dimensiones utilizadas se tomaron de la teoría de la brecha digital trabajada por García Ávila (2017) y por Epstein, Nisbet y Gillespie (2011). Se trabajaron 5 dimensiones y se hizo una interpretación a través de la hermenéutica y con un análisis comparativo de interpretación, polarización y nube de palabras para conformar los resultados de la investigación. En el análisis obtenido se notó que existe una nueva consciencia del uso de la tecnología a pesar de las fallas reales de las telecomunicaciones del país. El uso digital de la generación z es inminente pero sus recursos y uso no son los adecuados para una inmersión laboral adecuada. En general hay falta de planeación total en el uso de las tecnologías y de su potencial.

Industria 4.0, Perfiles digitales, Mipymes

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Introduction

The impact of technology and its use in MSMEs (micro, small and medium-sized companies) is imminent; However, the measurement of digital profiles and how they impact on the actions of commercial strategies and sustainable development in companies is not so common to identify. Generation Z, defined as Castro Gomez (2019), who are also called centennials to people who recently turned 20, that is, they were born with the XXI century at the beginning of 2020. This is a generation full of technology that has all kinds of access to digitization; However, the technological reality of a country that has wide digital gaps like Mexico, as well as that its new generations are experts but lacking the resources to be 100% in Industry 4.0 gives value to this research. The added value of qualitative studies such as focus groups gives us a perspective on how to interpret and describe the realities of companies and the new generation z. The new generation energetically handles technology; however, many times you don't have the right tools, resources, or connections to do your job or implementation.

The initial hypothetical assumption is that companies in Industry 4.0 need people with digital profiles according to their needs as well as the tools and adequate infrastructure to be able to compete in the business sector.

The sections presented are:

- The Importance of technology in MSMEs.
- Mortality and lack of technology in micro and small businesses in Mexico
- Digital profiles in Mexico and in the requirements of Industry 4.0.
- The change in technology and generation z as part of the new labor reality.
- Theoretical foundation: The reality of the technology gap in the inclusion of technology.

Importance of technology in MSMEs

The importance of technological changes and innovations have motivated what is called disrutive change in industries. According to (Garrell, 2020) these changes are slow and then accelerate until they become revolutions that change the world. Currently, the impact of Industry 4.0 is in technology and in all productive areas as well as in society that has impact consequences with a change in life as we know it today. There is a reflection about the positive and negative effects of this change that will depend on each country and in addition to this change, as well as the understanding and analysis so that they generate real effects on the affected people and on policies and organizations. This impact represents a change in the business, political and intellectual environments. Among the most rapid changes are the appropriation of digital tools, the use of high-speed mobile internet, the use of databases, the cloud of computing, artificial intelligence, new materials, new technologies, products and so-called smart designs. It is essential to have a global vision of the changes and the impact of Industry 4.0 in today's life. There is no way that it does not confront social personal spaces as well as business spaces and their new forms of interaction.

According to the reviewed literature Laguna (2019) there is a great need for small and medium-sized companies to incorporate technology so that business strategies are significant in productivity and efficiency. According to this author, SMEs constitute almost 50% of the income of any country. Especially in Mexico they play a decisive role and in Guanajuato they have a high impact in different sectors. Among the obstacles that do not support the development of technological implementation are that there are no competitive advantages in digital implementation strategies because the use of technology is lacking in different sectors and therefore action plans cannot be worked on.

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Mortality and lack of technology in micro and small businesses in Mexico

According to Sojo (2015), there is a very high mortality rate in companies in Mexico, it is considered that 11 out of 100 are the only ones that survive more than 20 years, which gives a wide accumulated mortality rate. According to the studies carried out by INEGI, the survival of companies depends a lot on the sector, size since micro and small companies have a life expectancy of 6.9 years, while medium have a hope of 22 years.

In the context of the use of technology, there is an inequality in their use that leads to people having a technological gap, according to (Ono & Zavodny, 2007) that Toudert (2014) comments, there is a division or digital divide that It is a complex process where the use of information technology is orchestrated from existing socioeconomic patterns. Therefore, in Mexico this gap represents a wide diversity of contexts. The study developed by Toudert (2014) presents an interesting panorama on digital profiles. Focusing this possibility on pigeonholeing the population in certain common characteristics that make them users of technology.

There are several approaches taken from the technological ones to be able to understand that the technological gap is, on the one hand, the access or non-access of the countries due to their socio-territorial context, such as those mentioned by (Epstein, 2011) that divide the digital divide in two: the first is the one that occurs due to the lack of access to information technology and the other that is based on the differences in the abilities and skills that people have to manipulate these technological tools. In this case we have countries with connection and digitization problems at the moment and in the face of the 2020 covid, Mexico has a growing challenge in the sense of connectivity but also has a challenge in the sense of the generation of information adjacent to use of the abilities and skills that people who are currently using technology have.

Digital profiles in Mexico

According to (Toudert, 2014) different prototypes of people with digital profiles are proposed in Mexico according to their use of technology. The profiles are represented according to their technological identity:

a) The marginalized of tics (they have neither access nor use).

b) Marginalized from ict: with moderate use of mobile telephony.

c) Incommunicated by ICTs: they have no need and do not know usefulness.

d) Communicated by ICT: professional and educational use.

e) Communicated by ICT: Recreational use.

f) More frequent with the computer than with the Internet: mixed purpose.

g) Less frequent with ict: school support and entertainment

Toudert's study (2014) declares that the first three profiles represent 63% of the current population in the Mexican territory. Which is very significant for this research because it tells us about people who are marginalized from information technologies with moderate use of mobile telephony or who do not know the needs or usefulness of the use of information technology.

Otherwise, they are the profiles that companies require for their effective development and immersion in Industry 4.0. According to the literature reviewed by Carbajal Rojas (2020) in industry 4.0, automation, robotics, information and communication technologies, among others, are evolving in companies faster and faster. The professional profiles that need to be different, taking into account the uses of programming languages, business development with a focus on innovation and analytical learning over the knowledge of the tangible as digital signals, mandatory understanding in all disciplines.

The change in technology and generation z as part of the new labor reality

There is a very important technological advance that has resulted in the changes of the generation below, in figure 1 possible aspects of this change are presented.

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Figure 1 Timeline of advancement in technology
Source: Based on Casacuberta, (2010)

There is a change in the adoption of technology and its uses in a dizzying way. The timeline shows us the differences between advances since the last century when the most modern research methods emerged, the beginning of computers until the moment of dizzying technological development. Generation Z was born with the massification of technology when the first cell phones appeared and their uses expanded to global levels. Their first technological encounters are from birth while people born in the twentieth century do not have that use of technology, which is why they are known as digital illiterates. According to García Avila (2017), people are digitally illiterate when they have limited access to the development of their interaction skills with technology. Obviously, those born before 2000 did not have these digital resources since the massive expansion of the internet begins until 1990.

Thus, we come to the description of generation z. According to García Avila (2017), this generation z generation is on average 7 hours a day in front of a monitor, be it a phone, computer, mobile phone, or console, their nature makes them not have difficulties understanding digital environments. Adults, teachers, parents of this generation have difficulties understanding the digital world. How are the actors in the generation?

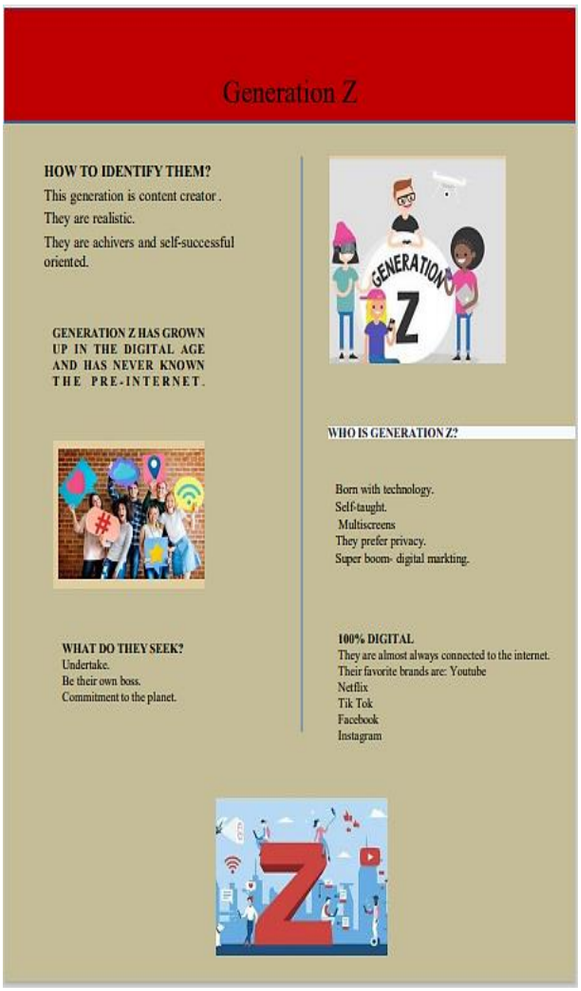

Figure 2 What is generation Z like?
Soyrce: Own elaboration based on Gutierrez (2018)

This generation is a highly digital generation they are born under technology. They are content creators unlike other generations who share content. It is a generation that works for personal success without being interested in standing out contrary to other generations. They are self-taught, multiscreen, and prefer digital discretion.

They are connected all day and their brands are digital like YouTube, Netflix, Tik Tok. This generation appreciates creativity and innovation as well as being entrepreneurial and highly committed to their rights as well as to the environment.

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Theoretical foundation: The reality of the technology gap in the inclusion of technology

According to García Avila (2017), the digital divide is a set of very important factors that consider the inclusion of generations and societies in the active environment of tics. This author comments that the reference to the use of the internet and the devices that are accessed has to do with membership and also with access limitations for the basic services of the same.

Theoretically, all citizens should have the same access but there are guidelines in the digital divide that has to do with generations and with social groups. According to Gértrudix (2016) cited by García Ávila (2017), citizens must have free access to overcome the digital divide. Access to information from the Internet, free access to free downloads and the use of modifiable information formats are considered important. Likewise, García Ávila (2017) comments that the social gap is also very important. Financial resources are required to acquire the technology.

Another identifiable data is in the design of education and the use of technologies for students. Student possession of devices does not guarantee a minor digital divide. Since you have to have a development of intellectual and socio-affective skills that allow the student to explore various sources of information and effectively use the various technological tools. An interesting case that is mentioned is that although the use of information has become more socialized, the use of tics is not even in the generations or even in the native ones, which causes that there is an instructional and generational gap. (García Avila, 2017)

Finally, returning to what Epstein (2011) cited, the digital divide comprises two stages that are accessibility and quality of technology as well as use in terms of skills, availability and appropriate use of technology.

According to these authors, the analysis suggests that there is a lack of access and skills in technology, which causes different patterns of behavior. In his analysis, particular initiatives are required to make common policies that bring together social differences in technological skills. Through an extensive analysis of quantitative research, the authors are of access and skills and that it depends on each government and its social, economic, educational and administrative factors the management of technology and the immersion of generations in the active economic life from a country.

Methodology to be developed

The methodology used was qualitative through focus groups using projective techniques for the execution of the group of entrepreneurs and students from generation z.

According to (Álvarez-Gayou Jungenson, 2011) who cites (Kruger, 1998), focus groups are artificial groups that do not exist before or after the conversation session. They are groups that are born the moment the dialogue begins. It is relevant that the participants do not know each other even though the author (Álvarez-Gayou Jungenson, 2011) comments that it does not really matter if they are known or not, but rather the topic of conversation that is fostered in the session. For their part, (Onwuegbuzie & Dickinson, 2009) refer that focus groups as an economic, fast and efficient way to obtain information from many participants. Likewise, the advantage of being socially oriented makes the participants have a sense of cohesion and self-help to safely share information. An interesting feature is also the ability to be spontaneous and provide solutions to problems even of a personal nature.

In this new reality of 2020 in the face of the COVID 19 pandemic, the focus groups were made with the digital zoom tool, a platform that allows us to interact in a certain time with the participants. An invitation was sent to the participants in a virtual way and they were reminded to attend the conference virtually, led by an expert moderator and a business development student who applied projective techniques during the session.

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The dimensions used for the focus group topic guide were in both cases: technology accessibility, technology connection quality, technology availability, technology use skills, and technology use skills. All these dimensions with different questions towards businessmen and students of generation z gave a hermeneutical type comparison where the interpretation was of comparison and contrast, the analysis of polar aspects (positive and negative) in addition to the word cloud in order to draw descriptive conclusions on the reality of generation z in the labor immersion.

The profile of the interviewees was from public and private universities for the analysis of generation z, their ages being 18 to 20 years. Likewise, they were high school students and had a way of connecting to the session through a mobile or desktop device at home. In the case of entrepreneurs, different entrepreneurs from MSMEs appeared, being entrepreneurs, business owners with 5 to 10 people and also entrepreneurs of medium-sized companies that had more than 50 people in their organization. All the participants were residents of León, Gto and the companies also had their headquarters in the city of León, Gto, although the medium-sized companies had branches in Querétaro and San Luis Potosí, as well as operations in various states of the republic.

Results

The results of the focus group were very interesting through the hermeneutics or interpretation analysis.

Table 1 was made with the information from the comparison and contrast analysis, obtaining the following results:

Dimensions	Generation z	MSMEs
ACCESSIBILITY IN TECHNOLOGY	Most of the students connected through their university to the network with relative ease. The schools of origin were public and private but had relatively good access for their connectivity. There was the option of computer center uses, through internet accounts. However, the networks are bad and of low quality. Classroom desktop computers work better in most cases than personal computer connections. Likewise, the use of technology is through platforms such as virtual classrooms, team, google class room, meet, whats app and gmail. Your best connections are through your cell phone or personal computer if you have any connection. Several students have only one connection for all computers and on average 4 to 10 devices connect at home.	Mainly the administrative type positions (offices) all have a computer and an email account. In addition, virtually all employees have smartphones. Mainly customers are contacted by WhatsApp, email and telephone as a last option. In these last 2 it will depend on the nature of the service or product, since it suggests a more formal closure and follow-up. An important aspect is that everyone uses at least 2 media. WhatsApp was the most mentioned social network, followed by Facebook as the main options for communication with clients, customer acquisition and follow-up and attention.

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QUALITY IN THE TECHNOLOGY CONNECTION	In some schools they have a good quality on the net. However, in others the quality is very bad and there is no support to improve connectivity. In general, there is quality and organization in educational organizations for their technological access. They have technology at home with connections through wireless network, wifi, cell phone and computer.	Entrepreneurs agree that the main problem they face are failures in wireless connections, associated with internet and Wi-fi. This is considered as external failures (loss of speed, the fall or saturation of a site), although most of them indicate that they do not have major technological problems and that they have an optimal functioning.
TECHNOLOGY AVAILABILITY	Generation Z users go online every day in their room in an average of 10-12 hours. They use them for different activities (Personal and for studies). They are mainly connected in their rooms, but also in living rooms, dining rooms and studies. They use social media for the purpose of communication. Social networks are widely used being their favorites instagram, whatsapp, tik tok and for official media email but they do not like to use it much more than for their school activities.	Technology can incredibly help business owners transform their companies into smarter, more effective and more versatile organizations, as well as being able to use their resources efficiently and react quickly to meet the demands of their customers. It is important to mention that companies recognize the benefits of each digital medium within their reach. That is to say, they recognize the scope, public to which they are directed. There is no choice of them by fashion.
TECHNOLOGY USING SKILLS	Most prefer to use their cell phone for personal use and use the computer for formal activities. The personal computer is more comfortable for school and doing research, homework, etc. They use their cell phones most of the day. They like it because it is more comfortable and practical to wear. In general, they use social networks to have communication, in addition to using their device for research on their studies as well as for fun and relaxation. The use of technology is for your personal communication, study and play, They like to listen to music, use social networks, do searches.	The participants describe that each of the tools offers them from new information, plans for promotion and advertising, social profiles to interact with other people, instant messaging, enough space to create sales post; In general, they offer a wide variety of elements that can be useful for the growth of your organization. The constant use of these means has led them to feel more comfortable, due to their practicality. Another important situation mentioned is the problem that occurs in marketing companies, when working with parcel and distribution companies. This becomes a double task, since in addition to taking care of their own problems, those of the companies they work with must also be considered. This leads companies to consider contingency plans and resolution of problems with the client or backups, as a preventive strategy.

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SKILLS IN THE USE OF TECHNOLOGY	They are avid users of information and fun online. The most developed skills in technology are information research. Social networks are widely used and their favorites are for the use of personal communication: Facebook, WhatsApp, Instagram, Youtube, TikTok. In the study and / or research use case they like to use: Google, Teams, Canva and Classroom. Mostly if they buy through the internet. His favorite objects are shoes, clothes and accessories, technology, drinks and food. They also buy personal hygiene and entertainment items. They mentioned they like buying with credit and debit cards to buy but the most frequent method of payment is in cash through physical stores such as OXXO. Among their skills they detect connection problems quickly such as connection speed and their reasons such as connection problems, weather, page slowness. Likewise, they detect false information, spam, advertisements, exposed information and lack of credibility in the networks.	The most popular apps for their practicality and comfort, again we have WhatsApp, Facebook and Instagram. Companies are also looking for other types of complementary apps to the nature of their business; more of an operational type that helps the management of the company itself.

Table 1 First Analysis: Interpretation of comparison and contrast
Source: Own elaboration

According to the results obtained, it is reflected critically that there are several similarities in the use of technology and digital tools in each group. The context of course changes, but the underlying reasons remain. Generation Z, such as MSMEs, find it relevant to use computers and especially smartphones (which, depending on their characteristics, offer infinite possibilities) that allow them to carry out their activities, whether academic, business or leisure. smart people begin to gradually erase the use of desktops and laptops. Its size, portability and practicality of use, makes it the device par excellence for each group.

Likewise, it was found that the use of Whataspp is the main tool used. The application has undergone significant changes, implementing better communication actions within it, such as sending files, conferences, linking the app with the computer, through WhatsApp Web and of course WhatsApp Business, which offers great possibilities to MSMEs to manage customer relationships. In addition, it is still a fun, practical and comfortable social network. The next social network is Facebook and a digital tool that does not go out of style and adapts very well to each context is still email. Recognition of the foregoing undoubtedly allows creating a strategic bridge between supply and demand. It is identified that, in different industries with different activities, they are no longer completely oblivious to the digitization of their operational and commercial processes; Especially now that the pandemic after COVID-19, I edge them to take that step.

Something important to highlight is the continuous adaptation of generation Z and MSMEs to digital tools. In both cases they use more than 2 means to carry out their activities. Even some of the business origin apps have migrated to the academic question. Making young people better know and adapt to these tools, which will undoubtedly be necessary in their professional field, such as: virtual rooms, Meet, Zoom. In addition, they are willing to go further, with the exploration of new digital tools that make their life and work easier.

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This is thanks to the constant output of apps available on IOS or Android systems, where options are identified for different personal needs (leisure), academic (work, research, classes, webinar and administrative processes) and business (prospecting, monitoring, closing sales, after-sales, training, special projects, import and export), allowing both Generation Z and MSMEs to carry out activities as part of a daily plan, as preventive and even contingency; especially if you work with third parties.

According to the results, both groups agree on the equipment of a Wi-Fi network in their workplace and recognize the importance of a good service provider that guarantees transfer speeds (in-bound and out-bound) and no partial drop or total of the service. Both groups are well aware of the benefits and scope of each available device and apps. They have access to them for prolonged periods on a daily basis and anywhere.

In a second analysis of opinion polarization, Table 2 is presented with the following results:

DIMENSION		Positive	Negative
ACCESSIBILITY IN TECHNOLOGY	Generation z	Generation z Schools have enough services and furniture. They have various platforms to connect with. They have connection to all parts of your house. They have a sufficient number of devices.	In schools the internet is not very secure and it is not of a good quality.
	Businessmen	Entrepreneurs have internet connection	Not all entrepreneurs have a stable connection
		The connections are of good quality and are sufficient in the case of medium-sized companies.	The internet is too bad the micro and small ones.
QUALITY IN THE TECHNOLOGY CONNECTION	Generation z	They have several devices but a single network for connecting many computers.	They generally have a bad signal and many times they communicate better by cell phone than by landline connections.
	Businessmen	Entrepreneurs have various devices that they employ in the business to communicate with customers ages 1 to 40. They can be connected in different parts, whether company or mobile, by fixed or cellular devices through the network.	They lack backup and databases. Some use email as a database. Microentrepreneurs manage networks like their databases and excel sheets. In general, everyone thinks that they have bad internet.
TECHNOLOGY AVAILABILITY	Generation z	They connect in places that are comfortable for them mainly. They have various technological devices and use them for different activities. They have several places to connect.	Many hours are connected.
	Businessmen	Entrepreneurs of midsize companies have devices to communicate with customers	Most micro and small entrepreneurs do not have the necessary devices
TECHNOLOGY USING SKILLS	Generation z	Most prefer to use any device. They use it most of the day Both devices can use them, but they use them for different things. They use it for fun, studies and communication.	The cell phone is not so comfortable (for school) They are not that comfortable for certain things.
	Businessmen	They communicate by various means with clients. Specifically on social networks such as WhatsApp, Facebook, Instagram, Gmail and telephone. All MSMEs have some type of access to technology regardless of their size and they manage it.	Not all entrepreneurs have this variety of social networks for communication. Regardless of the size of the company.
SKILLS IN THE USE OF TECHNOLOGY	Generation z	Device usage varies. They use many apps, the main ones being social networks and study and research platforms. Some buy on the internet. They have bought various things such as: Footwear, Clothing and accessories, technology, drinks and food. Hygiene and entertainment things. Those who have bought online have paid through credit cards and paid in cash through OXXO.	Some have not bought online. Some have not bought online. So, they haven't made any payments. Among the most frequent problems are: Problems with the connection due to weather, slowness of the page. False information, spam, advertisements, exposed information.
	Businessmen	In its use it is mainly basic for Facebook, instagram and whatsapp. They mainly use telephone and video calls to manage their communications. Little do they handle advertising on the networks.	They do not use the networks commercially for ads other than the micro and small ones with difficulty. They communicate directly but mostly seniors close sales in person. Micro companies do handle sales and shipments through social networks. They do not sell on web pages.

Table 2 Second Analysis: Polarization of opinions
Source: Own elaboration

It is important to recognize that there are very positive and favorable aspects that the use of technology and digital tools has brought. Even though it is more daily and normal to hear about the use of them, it is still necessary to close certain areas of opportunity that guarantee us proactivity, optimization and effectiveness in the use of them, as individuals and belonging to a digital society.

The results recognize the efforts of both Generation Z and MSMEs to enter into this dynamic. That is, it makes use of digital tools most commonly used in the world and despite the fact that these digital alternatives have evolved integrating new actions in their platform, there are certainly others, but they are not used especially due to ignorance.

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The above is supported by the responses of the participants from both Generation Z and MiPyMEs, since they basically only mentioned WhatsApp, Facebook, Instagram and email. Leaving out a large catalog of possibilities in IOS and Android systems, which especially allows companies a better commercial dynamic (purchases, marketing, sales).

Likewise, there is a factor to highlight that is the comfort for the Z generation. The lifestyle is prevailing and they favor it at the time of their connectivity with the technological environment, using various devices with different uses but that are connected at the same time. Generation Z can use the laptop for their academic activities but be connected on their cell phone to agree as a team how they can work. Internet coverage at home is a plus since it supports them to be doing more than one activity at the same time, such as having breakfast and listening to classes. However, they lack information technicians for their digital training. Technological connectivity is a new lifestyle that demands connectivity among its users for most of their day. Not only for academic matters, but also for socializing and entertainment.

In the case of entrepreneurs, it was verified that they all have an internet connection since companies must update and connect for the attention of its clients, as well as support in internal functions and attention to cover their supply needs. A negative point for entrepreneurs is that their internet connection is not always stable, which can be a weakness to address, since it can be an obstacle to the fulfillment of their business functions.

Micro-companies do not have backups of their information, as well as a database. The way in which microentrepreneurs back up their information is through their networks or with sheets of the excell program. In general, businessmen state that their internet is of low quality, which implies a risk to their growth. Although among the Z users, they have good internet coverage, it is identified that a single network provides connection services to many computers at the same time, which may cause that there is not enough connection quality for the users, the internet providers, suggest that from a low to medium coverage service, no more than 5 computers should be connected, since the quality of the service decreases.

These plans are acquired for their low cost. Having a bad internet signal at home, young people choose to use their cellular equipment with an additional cost by using data or an extra connection plan.

In the case of medium-sized companies, it is identified that the Internet connection is of good quality and has been sufficient for the fulfillment of its functions and services. It was identified that in micro and small companies the internet connection is not good, which may imply an obstacle to the development of their functions and their growth.

Third analysis word cloud

Figure 3 Compare and contrast cloud
Source: Own elaboration

Figure 4 Polarization word cloud
Source: Own elaboration

Both figures coincide with the previous analysis on each of the focus groups, it is reaffirmed in Figure 1 that networks, companies and technology have a fundamental role in addition to finding a precise means of communication for information, research and for make connections through various means.

The uses of people detected in Figure 4 is through devices and the constant mention of the internet as part of the change in the lives of the generation and of the companies. The use of technology is imminent and there is a great capacity for action in the communication of users z and entrepreneurs.

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Conclusions

It is important to mention that technology, digitization and the use of social networks have ceased to be what they used to be. Today they become an ally for companies. MSMEs have found a way to stay productive and competent, with the opening and acquisition of these media. It has helped them generate customers, follow up with them, orders and sales. Without a doubt, they recognize in them the possibility of continuing to grow their business, implementing improvements and innovation in their internal and commercial processes. The vast majority are aware of the possibilities that the connections and integration of all these media bring, as part of a strategy that is no longer reactive due to the pandemic, but as a sustainable strategy.

An interesting transmutation has taken place in recent years and months. The generations of entrepreneurs that do not belong to generation z who did not consider the use of digital technology, little by little have achieved constant adaptation and evolution. A better dynamic is envisioned every day, with the interaction in digital alternatives. There are even interesting hybrid proposals between the generations. The use of digital technology has allowed a necessary update in older generations; but this has given them a next chance to stay current and competitive. Today, the profile of people for academic, business or simply as individuals is highly considered.

Another reflection of the results is that despite the existence of willingness and access to smart devices, the relevant and stable internet connection must be guaranteed. A sufficient bandwidth, which allows a speed of sending and downloading, for any type of activity that is carried out online. The above would obey a law and government regulations that guarantee the above.

Therefore, less empirical actions are required, with a clear vision and in these times in a less reactive and more preventive way. An integrated and coordinated effort (Government, Society and Companies) is required for better results than what is already known in technological and digital material, as well as less waste and exploration of the unknown. This will require new knowledge management, constant training and not only the application of the IOT (Internet of Things" both to Generation Z and MSMEs, but also other tools that Industry 4.0 provides us (Big Data, Augmented Reality, Cloud, Integrated Systems, etc. heading towards the consolidation of a digital economy and society.

In the age of technological immediacy, connectivity, its quality and coverage are prevailing qualities among generation Z. In educational institutions a connectivity service is provided, in many cases it is not enough for them, this leads them to "need" an extra connection that involves an expense. In their homes, young people have good coverage and connectivity, but since there are more than 5 users and devices at the same time, the quality is reduced. In this sense, it would be necessary to assess the costs of being permanently connected and thus make decisions that support their academic and personal needs, this is a new lifestyle, it is the most necessary and used technological accessory among them.

The objectives of the research are fulfilled because they leave a descriptive panorama of the current reality of generation z that, although they are digital users, lack adequate connections and specialization in programs or design to handle more complex digital automation problems. The preparation and influence on education programs is imminent so that generation z is prepared in the appropriate use and can generate a successful labor inclusion in organizations.

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MSMEs need support in digital areas with adequate preparation since they lack backups of databases and technological uses. They are active in the basic use of information systems and management of social networks but lack the skills of process automation and detection of technological problems. A challenge is presented for companies in their training programs and for entrepreneurs in their automation as well as recruitment and selection processes. Profiles prepared in more complex activities and on more programming, platforms are required to activate and streamline company processes.

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Factors influencing the dropout of students at the Instituto Tecnológico Superior de Calkiní in the State of Campeche (ITESCAM). The case of the bachelor's educational program in administration

T Factores que influyen en la deserción escolar de alumnos en el Instituto Tecnológico Superior de Calkiní en el Estado de Campeche (ITESCAM). El caso del programa educativo de licenciatura en administración

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Abstract

In Mexico, the dropout rate is one of the most serious problems affecting society as at present, the rate of students dropping out of school is increasing, creating a problem of social, economic and cultural. In this sense, this research aims to identify the factors that cause students of Educational Degree Programme in Management Calkiní Higher Technological Institute in the State of Campeche (ITESCAM) abandon their studies. Also, try to expose the personal situation that the students decided to drop out of this discipline. The results of the qualitative analysis indicated that for deserters is not significant salary, when performing any work activity, as working conditions in the region are scarce and poorly paid. As the result of the quantitative analysis found that most deserters view the family as a support shaft to successfully complete their studies. However, studies by family tradition were not relevant to students, this means that for them no matter the academic level of the parents, because they have a very low educational level (primary). Therefore, for young defectors, is not attractive finish a career in the Bachelor of Administration for lack of the necessary conditions to find a decent and well paid in the region.

Factors dropout, ITESCAM, Bachelor of Administration

Resumen

En México, el abandono escolar es uno de los problemas más graves que afecta a la sociedad, ya que, en la actualidad, el índice de estudiantes que abandonan la escuela va en aumento, creando una problemática de tipo social, económica y cultural. En este sentido, esta investigación pretende determinar los factores que ocasionan que los alumnos del Programa Educativo de Licenciatura en Administración del Instituto Tecnológico Superior de Calkiní en el Estado de Campeche (ITESCAM) abandonen sus estudios. Así mismo, intenta exponer la situación personal por la que los estudiantes decidieron desertar de esta disciplina. Los resultados del análisis cualitativo señalaron que para los desertores no es significativo el salario, al momento de realizar alguna actividad laboral, pues las condiciones de trabajo en la región son escasos y mal remunerados. En cuanto al resultado del análisis cuantitativo se encontró que la mayoría de los desertores considera a la familia como un eje de apoyo para culminar con éxito sus estudios. Sin embargo, los estudios por tradición familiar no fueron relevante para los estudiantes, esto significa que para ellos no importa el nivel académico de los padres, pues estos tienen un nivel educativo muy bajo (primaria). Por tanto, para los jóvenes desertores, no es atractivo terminar una carrera profesional en la Licenciatura de Administración por carecer de las condiciones necesarias para encontrar un empleo digno y bien remunerado en la región.

Factores, Deserción escolar, ITESCAM, Licenciatura en Administración

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Introduction

In the current context in which education develops in Mexico and in which quality standards and certifications are sought, it is of great relevance to have current information on topics beyond the classroom, such as: the social, economic and cultural problems by the one that the young students of the Calkiní technology go through. Mainly, if this causes school dropouts or leads to lags in education.

The approaches will allow to have relevant information, which will serve to formulate actions aimed at responding to the situation faced by education in the Country in these aspects.

In this sense, this research aims to detect the problem experienced by students of the Calkiní technology administration degree in the State of Campeche and tries to expose the personal situation of the same students, and who have decided to leave the technology classrooms looking with in this way, recognize the causes for which school dropouts are generated.

History of the problem

School dropout is one of the most prevalent problems that affects society, since nowadays the rate of students who drop out of school is increasing, this problem is caused by various factors. In this sense Pérez (2002) explains:

The phenomenon of school dropout is not exclusive to certain social strata, although there are indications that coincide in pointing out a strong correlation between marginalization indices and low terminal efficiency.

Nor does it represent the exclusive preserve of the students of a certain school subsystem in our country, although it is true that in some of them the rates have been reduced significantly in recent years. Whatever the causes to which the desertion phenomenon can be attributed, the truth is that it represents an important source of personal frustrations and labor discrimination, coupled with a great waste of physical, economic and human resources (Pérez, 2002, PP.131-132).

The Calkiní Higher Technological Institute in the State of Campeche (ITESCAM) is a public education institution that offers 8 careers which are: Eng. In Biochemistry, Eng. In Food Industries, Eng. In Materials Science, Eng. Computer Systems, Industrial Engineer, Mechatronics Engineer, Computer Engineer, and Bachelor's Degree in Administration.

In the case of Tecnológico de Calkiní, students have a great diversity of financial support, ranging from not charging the return of their registration to allowing them to obtain different scholarships. All this allows them to have a better stay as students of technology. So, if the institution provides its student population with the necessary elements for their academic preparation, because there is so much student dropout, is it that those elements provided by the institution are not enough? Is it that the student does not take advantage of the maximum those opportunities?

Will they be problems external to the institution? With these ideas the following research questions are posed.

What are the factors that cause school dropout?

What factors are most associated with dropping out of the race?

Objectives

General

Determine the factors that cause students of the ITESCAM degree in administration to drop out of school.

Specific

- Determine what are the factors of school dropout
- Determine the factors that are most associated with the abandonment of the degree in administration.

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Theoretical framework

According to the dictionary of the Royal Spanish Academy, desertion implies abandoning obligations and separating from the crowds that used to be frequented. The word school, for its part, refers to that which belongs to or is related to the student or the school. Therefore, school dropout is a concept that is used to refer to those students who stop attending class and are left out of the educational system.

Student desertion, understood not only as the definitive abandonment of the classrooms, but also as the abandonment of academic training, regardless of the conditions and face-to-face modalities, is a personal decision of the subject and is due to a forced academic withdrawal not (by the failure of the student in academic performance, as in the case of expulsion for low academic average) or withdrawal for disciplinary reasons. It would then be said that dropping out is the student's choice, influenced positively or negatively by internal or external circumstances.

It is necessary to differentiate between dropout (and associated variables), of definitive dropout, such as student mortality, since the former is intra-subject and the latter is extrasubject (Paramo and Correa, 1999).

Attrition factors

The important factor to study are those factors that cause dropout in university students to spread in an accelerated manner. There are multiple factors that promote this phenomenon. Lopera (2007) considers the following as the most important:

Academics: Academic program, number of credits taken and approved per semester, average of credits approved per semester accumulated and current status of the student (dropout, active or graduated).

Personal: Age, sex, etc.

Academics of origin: School of origin, grades in their entrance exam, immediate start at the conclusion of their baccalaureate. Socioeconomic: Family income, occupation of their parents (both), studies of their parents (both), constitution of the family nucleus and dependencies of the student.

Dropout has many causes and these can arise during the educational process resulting in students not finishing the degree and this being stopped before it ends. According to Cabrera (2006), these causes may be some type of these or a set of these factors that are presented below:

Involuntary abandonment, either for breaching any condition of an administrative nature or breaking school regulations, such as the lack of registration documents, absences from class, etc.

Leave the race, to start another in the same school institution. This situation is very recurrent, especially those students who did not have a proper vocational orientation in high school or who enrolled for other reasons, such as the recommendation of friends, because the girlfriend (or) studies at that school, etc.

Leave the race to start another in a different institution. The foregoing comment is also applicable here; However, the loss for the student is greater, since generally in these cases, the subjects studied in the original institution are not studied in the second or only some of them (Cabrera, 2006).

For some students this year who lose for various reasons can be frustrating as they see it as a lost and badly spent year, leading them to consider it an academic failure, lowering their expectations and lowering their self-esteem.

From an institutional point of view, all students who drop out of higher education can be classified as dropouts. Thus, several authors associate desertion with the phenomena of academic mortality and forced withdrawal. In this sense, each student who leaves the institution creates a vacant place that could be occupied by another student who remained in their studies, for which the loss of students causes serious financial problems for the institutions by producing instability in the source of their income. (Red 1989).

Economic factor

School dropout due to the economic factor is defined by Tinto as follows:

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The economic factor also has its influence in any decision about university continuity and weighs much more in the beginning of the activity as a university student: Apparently, the most relevant consequences of economic factors occur at the time of entering higher education, since in this period most students must take into account their economic situation to structure their decisions (Tinto, 1987, p.86).

For his part, Himmel defines it according to the citations of other authors who have divided it into two models that make up the economic factor: According to the research carried out by Cabrera et al. (1992 and 1993), Bernal et al. (2000) and St. John et al. (2000) Two models can be distinguished:

(1) Cost / Benefit: consists in that when the social and economic benefits associated with students are perceived as greater than those derived from alternative activities, such as a job, for which the student chooses to remain in the university and (2) Subsidy Targeting: consists of the delivery of subsidies that constitute a way of influencing dropout. These subsidies are aimed at groups that have real limitations to pay for their studies. This model seeks to privilege the effective impact of student benefits over dropout, leaving aside perceptions about the adequacy of such benefits or the degree of adjustment of these to the costs of studies (Himmel 2002). The aid provided to students in the form of scholarships constitutes a weighting factor in the possibilities of permanence, observing that dropout rates vary depending on the amount and duration of financial aid available to the student body (Ishitani and DesJardins 2002).

Faced with economic hardship, a significant impact is caused by early abandonment (Ozga and Sukhmandan 1998).

The economic factor also has its influence in any decision about university continuity, and weighs much more in the beginning of the activity as a university student: Apparently, the most relevant consequences of economic factors occur at the time of entering higher education, since in this period most students must take into account their economic situation to structure their decisions (Tinto, 1987, p.86).

Social factor

School dropout due to the social factor is defined by Lujan and Reséndiz as follows:

In the literature on the topic of dropping out of studies, we find two other explanatory models: the structuralist model and the economistic model. The structuralist model focuses its explanation of the phenomenon of abandonment on the contradictions that the different political, economic, etc. subsystems possess. That make up society (Lujan and Reséndiz, 1981). When it comes to explaining the phenomenon of abandonment, it is necessary to highlight above all the contributions of Professor Tinto and his Theory of Persistence. Red (1975). He describes this explanatory model of dropout based on the contributions of Cullen (1973), based on academic and social integration. It postulates that those subjects who possess or develop the ability to delay rewards, to overcome obstacles and difficulties, to keep long-term goals clear, to firmly set the course or direction for the future and, ultimately, to be constant in the future. maintenance of the established plans, they will be those with the greatest probability of completing their higher studies.

Academic factor

School dropout due to academic factors is defined by Tinto as follows:

There are several critical periods in the student trajectory in which the interactions between the institution and the students can directly influence dropout. The first is developed during the admission process, when the student makes the first contact with the university. During the stage of inquiry into the requirements to enter a certain institution, students form their first impressions of its social and intellectual characteristics. These impressions originate to a large extent from the messages that are distributed to potential applicants in the admission process, through the different media, such as: brochures, television, radio stations, internet, among others.

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This contributes to creating expectations about the nature of institutional life prior to admission, and these expectations influence the quality of the first interactions established with the institution. The formation of expectations about the conditions of student or academic life can lead to early disappointments in the event that what is expected is greater than what is received. This sets in motion a series of interactions that lead to desertion. Therefore, it is essential that the institution, through the different communication channels or advertising media, generates realistic and precise expectations about the characteristics of institutional life in incoming students.

A second critical stage in the student's academic trajectory is the transition between high school and the institution, immediately after entering the institution (Montes 2002).

In the first semester, particularly in the first six weeks, great difficulties can arise. This occurs in large universities, because students are forced to move from the familiar and relatively safe environment of the school to the apparently impersonal world of the university, in which they must fend for themselves, both in the classroom and in the classroom. different institutional spaces. The speed and degree of the transition pose serious problems in the adjustment process for many students who are not able to fulfill independently. The feeling of being 'lost' or of not being able to establish contact with other members of the institution expresses, in part, the emotional situation in which many students find themselves.

Personal factor

School dropout due to personal factors is defined by Limares as follows:

In the family characteristics the variables are identified: number of members of the family group, educational level of the parents, employment situation of the parents, family income, place of residence (proximity to the university) and personal values (family and sociocultural). The variables that constitute the individual characteristics are: age, gender, marital status, employment situation, hours of work, initial commitment to the career, commitment to partial goals, satisfaction with the peer relationship, quality of health, study techniques and skills.

It is worth noting that there is an important relationship between family and individual characteristics (Limares et al. 2001).

Among the personal factors, psychological behaviors are included, according to Fishbein and Ajzen (1975):

These indicate that personality traits are what differentiate students who finish their regular studies from those who do not. These authors propose the Theory of Reasoned Action that analyzes behavior as attitudes in response to specific objects, considering subjective norms that guide behavior towards those objects and the perceived control over that behavior. They also point out that the 'intention to take action' is determined by two factors: first; 'attitude towards taking action', and second the 'subjective norm'. The subjective norm refers to how the individual is expected to behave in society, which is determined by an evaluation of the expectation. In the case of the decision to drop out or stay, it is influenced by previous behaviors, attitude about desertion or permanence, and subjective norms about these actions. Consequently, according to these authors, desertion is the result of the weakening of initial intentions.

An author who says that when behaviors do not go in the right direction, they result in a reduction in academic performance that is unsatisfactory, at a social and institutional level, which indicates a high probability that the student decides to abandon their studies, this The author was based on the suicidal model of Durkheim (1951) we are talking about Spady (1970):

Indicating that the dropout is the result of the lack of integration of the students in the environment of higher education; argues that the family environment is one of the many sources that exposes students to influences, expectations and demands, which in turn affect their level of social integration in the university; normative congruence acts directly on academic performance, intellectual development, peer support, and social integration.

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Socioeconomic factor

This factor is linked to the poverty of large sectors of the population; There is no doubt that malnutrition, disease, lack of employment, family disorganization, etc. They play a very important role in the existence of this problem. Among them we have: Financing difficulties, difficulties with credit, economic difficulties, lack of work, leaving the workplace for work reasons, difficulties with teachers or with fellow students, lack of financing in universities that do not have reimbursable scholarship aid programs and, if they exist, are highly limited by the capital managed by these programs. The high unemployment rate that exists in the country, the expectations of graduating from university and obtaining a job that allows them to have an adequate standard of living is quite daunting due to the inequalities that exist. The beginning or formation of a new family is a limitation to continue their studies successfully, due to new commitments and responsibilities.

Likewise, diseases, the lack of employment of the parents, the family disorganization, play a preponderant role in the existence of this problem. Although there are still no major studies to determine the level of incidence of socioeconomic factors in the dropout problem, it is clear that most dropouts or exclusion are due to this phenomenon.

Methodology

To determine the school dropout factors, the dropout rate for each of the factors and the relationship between the two, the type of study proposed was exploratory.

Which evolved to a descriptive one and ended as correlational, with a mixed approach and a non-experimental cross-sectional design, because although it was carried out in ITESCAM students, it is carried out in a unique time and space (Hernández, Fernández and Baptista, 2010), with the objective to describe variables and analyze their incidence or interrelation at a given moment. The method is field work using the survey as a technique, with the questionnaire as an instrument.

The approach is mixed, since there is information from a Likert scale for the quantitative part and open questions for the qualitative part, the result is a questionnaire that was later endorsed by three experts in the educational field.

Participants in the study

Of a total of 88 students enrolled in the Bachelor of Administration career from the 2011-2015 generation, 47 of them have dropped out, which should have been the students to be surveyed, but due to the lack of accessibility to reach them (They could not be located) only 14 individuals were surveyed. And for the analysis and interpretation of the results, the snowball technique was used. Which is indicated for studies of clandestine, minority or widely dispersed populations but in contact with each other. It consists of identifying subjects to be included in the sample from the interviewees themselves. Starting from a small number of individuals who meet the necessary requirements, which serve as locators for others with similar characteristics.

Instruments

A questionnaire developed especially for this study was designed and administered to the participants. In its construction three sections were considered:

In the first, general information on the interviewees is recorded in order to determine the characteristics of the population under study. The second includes eleven items with a Likert scale that will allow inducing, from the perspective of the participants, their experience, as well as questions that refer to respect for people, which is an indirect way to determine the dominant values in the participants. participants. This section was built according to the assumptions of Lopera (2007). The third section includes open questions to complement and improve the understanding of the quantitative results, in which it is intended to identify the reasons that have prevented the participants from continuing to study.

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Content validity was obtained by the judgment of three experts (Hernández et al., 2010) and for reliability this instrument was administered to the same people who participated in the pilot of the questionnaire, obtaining a Cronbach's alpha of 0.74, which it was considered acceptable.

Information analysis plan

Once the information was collected, the information was analyzed using Excel tools and the SPSS program. The scale used is: 1 is "nothing"; 2 is "little"; 3 is "sufficient"; 4 is "moderately"; and 5 is "a lot". On the other hand, the qualitative comments at the end of the questionnaire will be grouped by frequency of mention and will be organized into defined categories (Álvarez-Gayou, 2003). The results will be presented in statistical and descriptive form.

Results

Of the total of those surveyed, the majority consider the family as an axis of support for them to successfully complete their studies.

On a scale from 1 to 5 and where 1 is not important and 5 is very important, the average was 3.93. With this, a picture is obtained closer to the value that young people give to families and where the socioeconomic factor represents the main factor of success or failure in the completion of studies. We see how the students consider that the family is of great influence in the culmination of the career (See appendix 1).

When asked if his family trusts the young student's professional future, we see that on average there was 3.79 on the scale from 1 to 5, that is, it is above the average. This indicates that the perspective of the future is important for the family in the permanence or abandonment of school.

Another important point that young people consider to complete a degree is whether finishing a degree makes them money. This question had an average of 3.5, which shows that it is important for students that the career means money, with this idea it is decided whether to abandon or continue with the studies.

The confidence that the family gives to young people in their performance as a student is of great relevance, since the question of whether their family believes that they will obtain good academic results during their career is 3.43, with this we see that the relatives give them all the support in that sense to the young person and that studying depends on them only when it comes to performance, since parents or relatives consider that they send them to study at school.

The reasons for failure are exclusively due to academic aspects, as seen by the young people surveyed, since the question had an average of 3.43.

The study area to carry out their school activities or to study at home as in school is of great importance for the respondents since it is on a scale of 3.36.

Another indicator that is important for success or failure in completing a degree is whether after finishing high school is whether the young person has a clear idea about the type of studies he wanted to do. This question had an average of 3.29, being above the middle of the scale.

Conclusions

The factors that cause ITESCAM students to abandon the degree in Administration, the results obtained from the surveys applied to former students of the degree are as follows. The age of the respondents ranges from 22 to 24 years old and most of them are single, only 3 are married and were married during their stage in the career. About 57% of those who dropped out did so during the first two semesters of the degree, most of them currently have a job, according to the Likert scale that was used in the survey carried out, the result showed us that the main factor for which respondents dropped out was the academic factor since 50% mentioned that they dropped out because they failed several subjects and could not pass them in the recovery period and according to the academic curriculum of ITESCAM,. The personal aspects are what determine whether the young person continues in school or not, since school performance depends on them.

We can conclude that the issues that most impact school dropout are family support, this being a socioeconomic aspect.

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Studying for reasons of family tradition was the least relevant, that is, the training of parents is not taken into account to decide to study or not.

The school of origin is not so relevant in terms of success or failure in the culmination of the degree.

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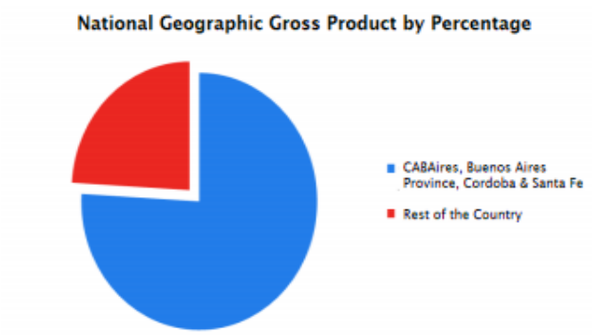

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