Volume 5, Issue 9 – July – December – 2021

Journal-Health, Education and Welfare

ISSN-On line: 2524-2075

RINOE®

RINOE Journal-Health Education and Welfare, Volume 5, Issue 9, July – December, 2021, is a journal edited semestral by RINOE. 21 Santa Lucía, CP-5220. Libertadores - Sucre – Bolivia, WEB: www.rinoe.org journal@rinoe.org. Editor in Chief: GUZMÁN - HURTADO, Juan Luis. PhD. ISSN: 2524-2075. Responsible for the latest update of this number RINOE Computer Unit. ESCAMILLA-BOUCHÁN, Imelda. PhD, LUNA-SOTO, Vladimir. PhD. 21 Santa Lucía, Cd. Sucre, Bolivia last updated December, 2021.

RINOE Journal-Health Education and Welfare

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Presentation of the content

In the first article we present, T*echnological stress in higher level students in San Luis Potosí,* by HUERTA-GONZÁLEZ, Juana María, MARTÍNEZ-TORRES, Rosa Elia, RIVERA-ACOSTA, Patricia and RENDÓN-SUSTAITA, Gloria Del Carmen, with affiliation in the Instituto Tecnológico de San Luis Potosí, as next article we present, *Analytical learning and teaching strategies in the classroom,* by ESPERICUETA-MEDINA, Marta Nieves, SÁNCHEZ-RIVERA Lilia, VILLARREAL-SOTO, Blanca Margarita and SALDAÑA-SÁNCHEZ, Melissa, with affiliation in Universidad Autónoma de Coahuila, as next article we present, *The impact of COVID-19 in higher education: case study students of the Tecnológico de Estudios de Villa Guerrero bachelor's degree in business administration*, by SANTANDER-VELÁZQUEZ, Fabiola, with affiliation in Universidad Del Futbol y Ciencias Del Deporte, as next article we present, *Study of graduates of the engineering career in industrial maintenance of the Universidad Tecnológica del Norte de Aguascalientes*, by VAZQUEZ-GUTIERREZ, Rosa Inés & MÉNDEZ-MACÍAS, Gerardo, with affiliation in Universidad Tecnológica del Norte de Aguascalientes.

Content

Article **Journal-Health Education and Welfare**
December 2021, Vol.5 No.9 1-8

Technological stress in higher level students in San Luis Potosí

Estrés tecnológico en estudiantes de nivel superior en San Luis Potosí

HUERTA-GONZÁLEZ, Juana María†*, MARTÍNEZ-TORRES, Rosa Elia, RIVERA-ACOSTA, Patricia and RENDÓN-SUSTAITA, Gloria Del Carmen

Tecnológico Nacional de México, Instituto Tecnológico de San Luis Potosí.

ID 1st Author: *Juana María, Huerta-González* / **ORC ID:** 0000-0003-0434-2115, **CVU CONACYT ID:** 1138959

ID 1st Co-author: *Rosa Elia, Martínez-Torres* / **ORC ID:** 0000-0001-8936-9207, **CVU CONACYT ID:** 953355

ID 2nd Co-author: *Patricia, Rivera-Acosta* / **ORC ID:** 0000-0002-8254-0005, **CVU CONACYT ID:** 232611

ID 3rd Co-author: *Gloria del Carmen, Rendón-Sustaita* / **ORC ID:** 0000-0003-7769-5491, **CVU CONACYT ID:** 610903

DOI: 10.35429/JHEW.2021.9.5.1.8 Received July 10, 2021; Accepted December 30, 2021

Abstract

During 2020, in the face of the recession caused by the COVID19 pandemic, public and private sectors suffer massive losses that force them to promote strategies for immediate reactivation. Education in México, despite estimating a considerable lag, had a favorable reaction towards "online classes" in all education levels. Through technological resources, administrative, teachers, parents and students were involved without having the opportunity to be questioned. As a result of this, a study was proposed with a quantitative approach and descriptive method, to keep record of the effects presented by college students before this modality. Natural stress is associated with social isolation through dimensions involving ICTs with the aim of *diagnosing the personal, family, social and technological impact on college students in San Luis Potosí, to determine the effects that are adverse to their learning and professional life*. The results will contribute to the development of strategies associated with the effective use of the ICTs that institutions offer and facilitate the teaching-learning process; the study also concluded according to the integral well-being of the student in this new modality.

Online education, ICT, Educational stress

Resumen

Durante 2020, frente a la recesión causada por la pandemia COVID19, sectores públicos y privados, sufren fuertes pérdidas que los obliga a promover estrategias de reactivación inmediata. La Educación en México, a pesar de estimar un rezago considerable, tuvo una favorable reacción hacia las "clases en línea" en todos los niveles. A través de recursos tecnológicos, administrativos, docentes, padres de familia y estudiantes, se vieron involucrados sin tener la oportunidad de ser cuestionados. Derivado de ello, se planteó un estudio con enfoque cuantitativo y método descriptivo, para documentar efectos presentados por estudiantes de nivel superior ante esta modalidad. Se identifica el estrés natural asociado por el confinamiento a través de dimensiones que involucran las TICs con el objetivo de *Diagnosticar el impacto personal, familiar, social y tecnológico en los estudiantes de nivel superior en San Luis Potosí, para determinar los efectos que sean adversos a su aprendizaje y formación profesional*. Los resultados contribuyen al desarrollo de estrategias asociadas con el uso eficaz de las TIC que las instituciones ofrecen y facilitar así el proceso de enseñanza aprendizaje; se concluye además en función del bienestar integral del estudiante ante esta nueva modalidad.

Educación en línea, TIC, Estrés educativo

Citation: HUERTA-GONZÁLEZ, Juana María, MARTÍNEZ-TORRES, Rosa Elia, RIVERA-ACOSTA, Patricia and RENDÓN-SUSTAITA, Gloria Del Carmen. Technological stress in higher level students in San Luis Potosí. Journal-Health Education and Welfare. 2021. 5-9:1-8.

* Correspondence to Author (Email: juana.hg@slp.tecnm.mx).
† Researcher contributing as first author.

Introduction

The new normality after COVID-19 makes online education evident, breaking paradigms of traditional school systems, using information and communication technologies (ICT) facilitating learning interaction with technological resources. In Mexico there are 87.4 million internet users from the age of six, which represents 74% of the population in that age range, of which 51% are women and 49% men, in Mexico there are 18.3 million households with internet through Wi-Fi or mobile connection, in 2019 the national total was 56.4%, which means an increase of 3.5% compared to 2018 (INEGI, SCT, IFT, 2019).

The incorporation of ICT in various context of the human being has implied a change in communication processes, before the pandemic, teachers were only contacted at the educational institution, however, currently, with the use of the cell phone, e-mails, social networks and work from virtual environments, teachers can be contacted inside and outside school, expanding communication time between students and teachers, which dilutes the line that exists between the academic field and personal space (Alfaro, 2009).

With the COVID-19 pandemic, teachers, students, administrative staff and parents have faced to the use of technological tools to perform work- related actions and academic activities, stress is derived for teachers and students for the use of information technologies and communication in the teaching process, learning by providing quick answers with the use of instant messaging, and email through educational platforms, most of the time inside and outside working hours causing exhaustion, worry, depression, headache, bad mood and muscle tension.

Technostress, is defined as

> "a negative psychological state and an adaptative response caused by the excessive use of the information and communication technology (ICT) and the lack of handle or work with them in a healthy way" (Patlán s/f, quoted in Olvera, 2017).

This type of stress occurs more often in college students being a process of physical and mental effort; psychologically the school demands are perceived as stressful environments that affect in academic development becoming a process of spoilage in the use of the ICT.

This research aims to identify factors and levels of technological stress regarding confinement that college students from San Luis Potosí capital are presenting from universities Institute Tecnológico of San Luis Potosí, University Autónoma of San Luis Potosí, University Politécnica campus San Luis, Institute Tecnológico Superior of San Luis Potosí; This study is experimental, descriptive, quantitative to a non-probability sample of convenience, information was obtained through the application of technological stress questionnaire adapted from López (2018), in which were analyzed the following dimensions: attitude towards ICT, school or work stress, ICT effects and social media, ICT and education. Results contribute to the development of strategies associated with the effective use of ICT that are offer by institutions and facilitate the process of teaching and learning that contributes in the integral wellness from students in the new normality.

Literary basis

In precise terms, for Trianes, Fernandez, Escobar and Maldonado, (2012), school stress could impact students and teachers, regardless of the educational level they belong, but there are also some types of stress that are associated with the excessive use of ICT, either through mobile devise exposure, computers or any other gadget that facilitates its application; Remon, B (2012) some of them are:

- Techno-anxiety recognized as an unpleasant feeling of tension and discomfort for the use of technology.

- Technological stress, where the person perceives high levels of physiological activation uncomfortable presenting tension due to the use of some type of ICT, reflected in fear, anxiety, insecurity regarding the use of the resource.

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- Technophobia that focuses on the affective dimension of fear and anxiety towards ICT, three dimensions are defined: (a) endurance to talk about technology or think about it; (b) fear or anxiety about technology; (c) hostile and aggressive thoughts towards technology.

- Techno fatigue recognized by the appearance of mental fatigue and inability to structure and assimilate new information from the internet described by skeptical attitudes, emotions of weakness and mental exhaustion and cognitive due to the use of technologies with the use of ICT.

- Techno addiction, which is regarded as the uncontrollable need to always use technology and places.

- Techno dependence, stress related to compulsive use of ICT.

López (2018), considers technostress as a feeling of incapacity to achieve a satisfactory degree domain of technology, while in other types of users generates a certain degree of dependence on its use. The user has symptoms such as irritability when receiving instructions, Alfaro (2009), establishes four dimensions:

- Attitude towards ICT, referring to an acceptance or rejection rate. This attitude of rejection can be due to dysfunctional behavior patterns. In this sense Brod (1984) points out that those who reject technology have some fear of feeling threatened, stressed and furious about machines, that do activities that they would take hours to do.

- Work or school stress translating it as the discomfort that the student presents due to physical factors, emotional or environmental factors that have significant pressure on individual competence to face school context.

- Social networks and ICT, recurses that are used in education, defined as a support tool in leaning. Among the common social networks are WhatsApp, Facebook, Twitter, YouTube, Instagram, etc., not referring to any other social network created for educational purposes.

- Effects of the use of the ICT, recognized for the negative effects of the use of ICT.

Salanova, Llorens, Cifre and Nogareda, (2017), explain that ICTs by themselves are neutral, they do not generate positive or negative effects, however, when they relate to the subject this is when negative effects such as: anxiety (techno-anxiety) and even mental fatigue or exhaustion (techno-fatigue); recently another phenomenon has been observed relating to damage psychosocial related to the use of ICT such as addiction to technologies, Internet, e-mail, mobile.

Developing

A quantitative study with mixed approach is presented, with a descriptive correlational character, transactional and non-experimental to a non-probabilistic convenience sample of 382 students. The questionnaire was adapted from López (2018): Technological Stress questionnaire, which refers to this dimension: Attitude towards ICT (AFT), work or school stress (ELE), effects of ICT use (EUTIC) and, social media, ICT in education (RSYTIC); their interpretation is expressed on the basis of a ordinal scale of type Likert, with intervals of affirmations.

A statistical analysis was performed with which internal consistency was tested and validity of the instrument. The sample was made up for a total of 382 college students of public universities in the capital of state San Luis Potosí, 41% are men and 59% women:

- Instituto Tecnólogico of San Luis Potosí, representing 51% of bachelor's in administration, business management's engineering, Engineering in mechatronics, computer systems engineering, Informatics engineering;

- Instituto Tecnológico Superior of San Luis Potosí representing a total of 14% of the careers of engineering in administration, industrial engineering, Mechatronics engineering, Computer systems engineering.

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- Universidad Autónoma of San Luis Potosí, representing 18% of Anthropology, Architecture, Accounting, Industrial design, Physiotherapy, Environmental engineering, Biomechanical engineering, Civil Engineering, Food Engineering, Chemical engineering, Medicine, Veterinary medicine and zootechnics, Psychology, Pharmacobiologist chemist, careers.

- Universidad Politécnica of San Luis Potosí, representing 17% of Engineering in systems and industrial technologies, Engineering of technology information, Manufacturing technology engineering, bachelor's in administration and Management and International marketing careers.

Based on formulated hypotheses, results that allow fulfillment of the objective of the study are categorized; through analysis of student responses about of the standard deviations for the dimensions considered to represent technostress.

Results

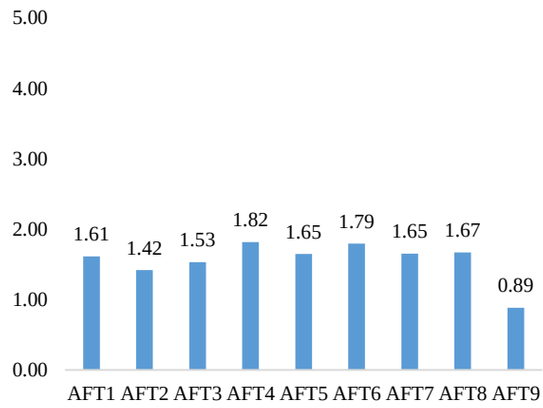
The ages are between 18 and 27 years with an average of 21 years. 97% have an internet connection from home meanwhile 3% have report to not have internet at home. With confinement for school reasons 5% of students use the internet for an hour or less, and 95% use internet for 12 hours or more.

The equipment used is 12% desktop computer, 40% laptop, 0.5% tablet, 30% smartphone and, finally 16% with all the devices mentioned before. Students use for their classes the following platforms, zoom never 0.5%, partially 0.26% and 99% totally, use of Google classroom platform 79% never have used it, 18.5% partially use it and 1.5% totally; use of Teams never 2% partially 4.4% and 93% totally and, Blackboard 76% never have used it, 8.9% and totally 15%.

Use of moodle platform never 33%, partially 23% and 44% totally.

Below is the analysis of the instrument applied under an ordinal Likert scale of intervals that uses a series of statements where a response is obtained with values; 1 completely disagree, 2 disagree, 3 neither disagree nor agree, 4 agree and 5 totally agree. Values above or below scale 3 show a positive or negative attitude, scale 3 is neutral.

Dimension: *Attitude towards ICT (AFT)*



Graphic 1 AFT in time of pandemic
Source: Own elaboration

As shown in graphic 1.

AFT1 Question "Over time ICTs interest me less" As a result, the weighted average of the students represents 1.61% that means they disagree with this statement due to the importance that a proactive attitude towards the use of devices has in the learning process in this pandemic.

AFT2 Question "I feel less involved in the use of ICT" The statement of the students is in disagreement which represents 1.42% because they are involved with the use of ICT.

AFT3 Question "I could do my homework or jobs without the ICT" The statement of the students is 1.53% in completely disagree because the use of them is required to fulfill academic responsibilities.

AFT4 Question "I often have a hard time sleeping when I have a lot of work related to the use of ICT" As a result , the statements represent 1.82% in completely disagree, at this time there is flexibility in both the schedules for academic obligations and even classes recordings are available to the students when they require it.

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AFT5 I find difficult to relax after a day's work using ICT.

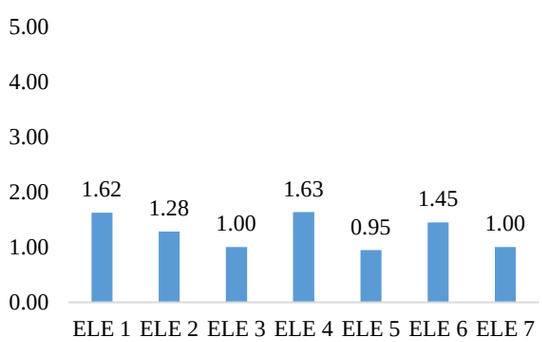
AFT6 Question: "I am so tired when I finish working with ICT that I can't do more" As a result, the statements of the students represent 1.65% and 1.79% in completely disagree, respectively, the attitude of students is indifferent due to the adaptation of knowledge and use of ICT.

AFT7 Question "I doubt when I use technologies" As a result, the statements represent 1.65% in completely disagree this means that they are not afraid of making mistakes because they have a positive vision of trial and error and when using ICT allow them to learn new information.

AFT8. Question "Working with ICT makes me feel uncomfortable, irritable and impatient". As a result, the statements represent 1.67% completely in disagreement which means that the attitudes are positives when using ICT because you can find a diversity of information.

AFT9. Question "In my opinion I am effective using technologies" As a result, the statements represent 0.89% in completely disagree, which indicates that students do not feel effective when using technology during pandemic due to large amount of information that is available and the lack of time to analyze and synthesize the information. College students of San Luis Potosi show a moderate attitude that means they adapted to pandemic and the need of the use of connectivity, electronic devices, behavior, feelings and generate positive responses in the learning process due to pandemic.

Dimension: Work or school stress (ELE)



Graphic 2 ELE in time of pandemic
Source: Own elaboration

Values are observed in Graphic 2.

ELE1. Question "I get frustrated when they implement new technologies in my place of study" As a result, the statements represents 1.62% the statements are in complete disagreement because students adapt quickly to new technologies during pandemic, because most of the educational platforms have similarities in terms of accessibility and resources available for the teaching- learning process.

ELE2 Question "I have resistance to the use of technology that is supposed to improve educational processes" As a result, statements represent 1.28% in completely disagree, students are resilient they accept the circumstance and stress becomes an opportunity for the teaching-learning process.

ELE3 Question "I have multiple windows open in the browser to multitask at the same time" As a results, statements represent 1.00% completely disagree, students use a single window to do their activities because they have to focus on their classes also there are so many technological distractors in the environment so it's not convenient to have several windows open.

ELE4 Question "I need to check my cell phone notifications immediately, even if I interrupt what I'm doing" As a result, statements represent 1.63%, strongly disagree students in lockdown are not aware of notifications unless they are important school notifications.

ELE5 Question "I am exposed daily to a large amount of information through ICT", statements represent 0.95% completely disagree, students are exposed to a large amount of information, however they do not show tension because they are familiar with the large amount of digital information to which they are exposed due the pandemic.

ELE6 Question "I despair if I don't have internet" As a result, the statements represent 1.45% in complete agreement, if they do not have connectivity causes tension and anguish because they cannot meet their academic obligations.

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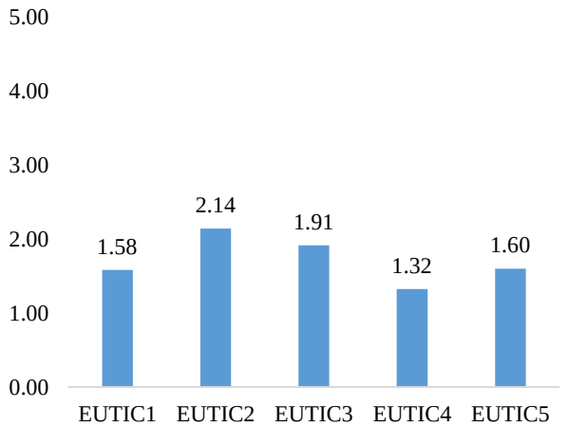
ELE7 Question “I get annoyed when I’m with my friends and family and that’s why I rather to be on the internet”. The statements represent 1.00% completely disagree in fact students prefer to socialize with family and friends once they finish their academic obligations. In summary, the school or work stress symptoms are positive in their adaptation: workloads, schedules, use of devices, but there is not a psychological impact such as anxiety, depression, cognitive and social in the learning processes in the pandemic.

Dimension: Effects of using ICT (EUTIC)



Graphic 3 EUTIC in time of pandemic
Source: Own elaboration

As results observed in graphic 3 EUTIC are the following:

EUTIC 1. Question “When I use my device for online classes, I can spend hours without realizing it” As a result, statements represent 1.58% in completely disagree, in other words online classes have specific schedules and they are recorded to consult any questions, relying on platforms for academic obligations with specific dates and schedules.

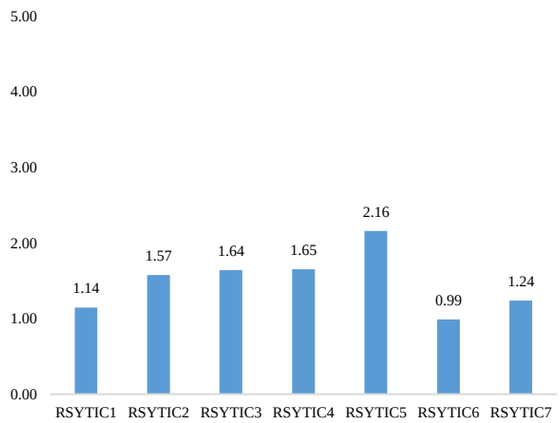
EUTIC2. Question “Sometimes I forget to eat when I am using my device for school reasons” As a result, the statements represent a 2.14% in disagree which means that they can eat while they are on online classes or doing homework.

EUTIC3. Question “When I finally put turn off the device, I feel very anxious or nervous and sometimes even angry” As a result, the statements represent 1.91% in completely disagree; students are relieved to not use a device after online academic activities.

EUTIC4. Question “I fulfill all my responsibilities despite the constant use of a device” As a result, the statement represents 1.32% in completely disagree they fulfill all their activities however the use of the device is not constant.

EUTIC5. Question “On weekends I spend all day using my device” As a result, the statements represent 1.60% in completely disagree, students are tired and have no interest in using devices on the weekend. In conclusion, the dimension effects on the use of ICT because is below level 3, which indicates that the effects with the use of ICT are measured and, in the pandemic, they don’t reject technology, neither they feel stressed or fatigued by the use of ICT.

Dimension: Social Networks and ICT (RSYTIC)



Graphic 4 RSYTIC in time of Pandemic
Source: Own elaboration

The results of graphic 4 RSYTIC are described below.

RSYTIC1. Question “I use of social networks to share files, links or information about homework with my classmates” As a result, statements represent 1.14% in completely disagree, because during pandemic students use academic platforms where the activities and resources for academic activities are established.

RSYTIC2. Question “There is a social network group with the teacher for school purposes only”.

RSYTIC3. Question “There is a group on common social networks with the teacher for school purposes only”.

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RSYTIC4. Question "The teacher answers school questions through social networks" As a result, the statements represent 1.57%, 1.64% and 1.65% in completely disagree. Universities use platforms for online education such as zoom, google classroom, teams, blackboard and moodle all of them have instant messaging as a resource so teacher can give instructions, clarify doubts and students can exchange information in real time.

RSYTIC5. Question "Video calls are used as a social network to clarify school doubts" As a result, the statements represent 2.16% in disagreement they are not only used to clarify doubts but also as a part of the new normal, online teaching through videoconferences where college students connect synchronously to a virtual classroom where they have a bunch of resources, Integrated applications and can virtually interact teacher and student.

RSYTIC6. Question "My teachers use ICT for better teaching" As a result, the statements correspond to 0.99% in completely disagree, probably due to the sudden change in the modality face-to-face to online classes, and even when the teachers were trained for this modality, they have not being able to use all the resources available in educational platforms and social networks to optimize the teaching-learning process.

RSYTIC7. Question "Homework is easier when I use ICT" As a result, the statements correspond to 1.24% completely in disagree despite the facility with internet or use of devices, sometimes the activities are not correctly structured or they don't give clear specifications or a detailed rubric which causes confusion between what teacher expects from homework and what the student deliver. It ends with the analysis of the social networks and ICT dimension. Indicating that it's below scales 3.

The use of social networks and ICT is favorable at this pandemic time and the strategies adopted by colleges are accepted and don't cause stress.

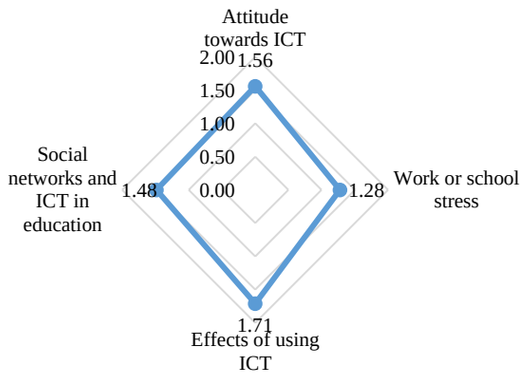

Figure 1 Techno-stress dimensions in times of pandemic
Source: Own elaboration

The final result is presented as an image that concentrates the information obtained by the dimensions analyzed; with this it is possible to observe that: College students show an average of 1.56% in their attitude towards ICT, interpreted as an attitude of acceptance. The effects of the use of ICT shows an average of 1.71% as a low level, Work or school stress (ELE) oscillates at 1.28%, also indicating a slight functional stress due changes in habits, social networks and ICT in education (RSYTIC) with an average of 1.48%, indicating efficient use of these resources.

Conclusions

In México the inequality in access to information technology makes it impossible to access the knowledge, search and learning through ICT. The challenge is to establish public policies for infrastructure for access to information so we can take better advantage of the dynamics that are taking place in online classes.

In this study it was observed that despite the conditions due to pandemic and the use of alternative resources, college students through a sample from public universities in San Luis Potosí capital, show a positive attitude in this new normality because students have knowledge and skills in technological tools. That allow quick adaptation to tech-learning strategies and incorporated new training technologies to solve academic demands. The communication at distance became a necessity in the pandemic and to give continuity to the educational process, online education was implemented where work or school stress has a close relationship with the effects of the use of ICT.

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The digital divide and digital literacy at the moment have very significant effects on students who have moderate stress due to school. Finally, work or school stress is related to social networks and ICT in education during pandemic because students had to get used to a new learning process, which implied challenges of autonomous academic work to generate knowledge.

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ISSN 2524-2075

Article **Journal-Health Education and Welfare**
December 2021, Vol.5 No.9 9-14

Analytical learning and teaching strategies in the classroom

Estrategias analíticas de aprendizaje y enseñanza en el aula

ESPERICUETA-MEDINA, Marta Nieves†*, SÁNCHEZ-RIVERA Lilia, VILLARREAL-SOTO, Blanca Margarita and SALDAÑA-SÁNCHEZ, Melissa

Universidad Autónoma de Coahuila. Faculty of Science, Education and Humanities, Mexico.

ID 1st Author: *Marta Nieves, Espericueta-Medina* / **ORC ID:** 0000-0002-4924-4332, **Researcher ID Thomson:** T-1500-2018, **arXiv Author ID:** Espericueta2018, **CVU CONACYT ID:** 372705

ID 1st Co-author: *Lilia, Sánchez-Rivera* / **ORC ID:** 0000-0001-9468-2599, **Researcher ID Tomson:** T-1404-2018, **CVU CONACYT ID:** 613195

ID 2nd Co-author: *Blanca Margarita, Villarreal-Soto* / **ORC ID:** 0000-0001-9314-8001, **Researcher ID Thomson:** 2357-2018, **CVU CONACYT ID:** 947979

ID 3rd Co-author: *Melissa, Saldaña-Sánchez* / **ORC ID:** 0000-0003-4376-8856, **CVU CONACYT ID:** 1063150

DOI: 10.35429/JHEW.2021.9.5.9.14 Received July 15, 2021; Accepted December 30, 2021

Abstract

The main objective of this work is learning styles and academic performance, the main objective is to know the factors that integrate them to make proposals for curricular design that guide the teacher regarding the best didactic strategy to use in the classroom. The ILP-R Questionnaire Spanish version of (Schmeck, 1991) was used, made up of 150 simple variables that make up 18 dimensions, with a Likkert-type scale the results where a cronbach alpha of .92 is obtained, in addition, the information was processed through of the statistical analysis: descriptive from frequencies and percentages, comparative with Student's t test for independent groups and Integrational with factor analysis. It is deduced that proactive students tend to learn in a pragmatic-solitary way leading to a better ability to memorize information and planning their studies, at the same time that they can carry out various activities which allow them to satisfactorily carry out their school activities. It is concluded that while the students carry out their activities separately, it helps them to gain independence, which is why they benefit from their responsibility in the academic field, an aspect to be considered by the teacher when choosing their didactic strategy.

Learning style, Academic performance, Teaching strategy

Resumen

El presente trabajo tiene como ejes los estilos de aprendizaje y el rendimiento académico, el objetivo principal es conocer los factores que los integran para realizar propuestas de diseño curricular que orienten al docente respecto a la mejor estrategia didáctica a utilizar en el aula. Se utilizó el Cuestionario ILP-R versión española de (Schmeck, 1991) conformado por 150 variables simples que conforman 18 dimensiones, con una escala tipo Likkert los resultados donde se obtiene un alfa de cronbach de .92 además, se procesó la información por medio de los análisis de la estadística: descriptiva desde frecuencias y porcentajes, comparativa con prueba t de Student para grupos independientes e Integracional con el análisis factorial. Se deduce que los alumnos proactivos suelen aprender de manera pragmática-solitaria llevando a tener mejor capacidad de memorizar información y planificación de sus estudios, a la vez que pueden realizar diversas actividades las cuales les permitan llevar satisfactoriamente el cumplimiento de sus actividades escolares. Se concluye que mientras los alumnos realicen sus actividades por separado estos les ayuda ir tomando independencia por lo que se ven beneficiados en su responsabilidad en ámbito académico aspecto a considerar por el docente al momento de elegir su estrategia didáctica.

Estilo de aprendizaje, Rendimiento académico, Estrategia didáctica

Citation: ESPERICUETA-MEDINA, Marta Nieves, SÁNCHEZ-RIVERA Lilia, VILLARREAL-SOTO, Blanca Margarita and SALDAÑA-SÁNCHEZ, Melissa. Analytical learning and teaching strategies in the classroom. Journal-Health Education and Welfare. 2021. 5-9:9-14.

* Correspondence author: (Email: mnieves@uadec.edu.mx)
† Researcher contributing as first author.

Introduction

The present work seeks to explain the relationship that exists between learning styles and academic performance, looking for the importance that both have in decision-making at the moment in which the teacher chooses the didactic strategy to use, as well as in the creation of plans and programs aimed at the surveyed population, which in this case are upper-level students.

With a methodological weight that helps to see what has already been studied previously on the subject of learning styles and academic performance that serve as the basis for the course of research using the ILP-R questionnaire, Spanish version of Schmeck in 1991.

Learning styles are important in education so that students can carry out their tasks and activities related to the subjects they study during their career, as well as identify the way in which they are facilitated either through summaries, comparative tables, case method or any other way you can learn and it is meaningful.

The foregoing is important because authors such as P. Primerano and MB Sánchez Arraba (2021) in a study conducted on online experiences in times of COVID-19 mention that ICTs in classrooms need to be implemented as democratically thought tools, so that virtual classrooms and networks do not become walls and that we become trapped in them as individuals, all of this taking into account the characteristics of the learner**.**

Gia Guerrero (2021) in her research work on didactic strategies mentions that the teacher is the protagonist and facilitator of the application of strategies. These should address the basic learning needs, their forms, styles and environments. In this way, students seek creative and alternative solutions for solving tasks and develop critical and analytical skills.

Likewise, Celi Celi D M., Salinas González JE (2021) in their research work on strategies for teaching literacy in basic education students suggests that the implementation of didactic strategies is a key point in the training process of the student body, because it allows them to develop different skills such as text comprehension, information analysis, data identification and prediction skills, so teachers have to know which didactic strategy is appropriate since children have different styles of learning, it is for this reason that teachers have to bear in mind that they cannot implement the same didactic strategies for all courses.

The theory of learning styles, from an epistemological point of view, deals with different perspectives and practices with their corresponding theoretical foundations, classifications and research instruments. Due to this, it is pertinent to raise the various currents that back up this theory, he mentions (Ventura, 2011).

Supporting previous studies, Ventura, Moscoloni and Gagliardi (2012) showed that, although students enter university with heterogeneous styles, these discrepancies are statistically accentuated according to the type of discipline. In Engineering, sensory and visual styles were preferred; and in Psychology, the intuitive and verbal styles predominated.

Reaffirming these differences, Villamizar Acevedo and Sanabria Martínez (2011) found that both Psychology and Engineering newcomers were characterized by preferring a reflective style. However, towards the end of academic training, Psychology students maintained their reflective predominance and Engineering students consolidated their preferences towards the pragmatic style.

The Schmeck model (Ramanaiah, Ribich and Schmeck (1977) for example focuses on learning strategies and considers that the student, in a conducive school setting, performs double learning; that related to pedagogical content and that related to the thought process, in order to develop understanding, synthesis and analysis, elements on which thought processes are based. Three learning styles are proposed, each one involves the use of a particular learning strategy by the individual.

ISSN 2524-2075

Teachers tend to put learning styles aside and carry out non-functional activities in that students can use it in their working lives and sometimes students do not agree with the execution of the activity and do not usually learn or carry out the activity because this is not attractive to the student.

The hypothesis is: There is a relationship between learning styles and academic performance in higher-level students.

Know what attributes make up the learning styles and academic performance that promote teaching, and identify how they are integrated between them, so that there is an interrelation. Previously, various authors have delved into the study of both axes and they start from them and the methodological weight fell on them.

For Schmeck, a learning style, "is simply the cognitive style that an individual manifests when faced with a learning task, and reflects the preferred, habitual and natural strategies of the student to learn, hence it can be located somewhere between personality and learning strategies, since it is not as specific as the latter, nor as general as the former". (Schemeck, 1982).

Llanos Mosqueda (2021) mentions that the methods and techniques have contributed to the preparation of students, the definition of strategies for learning programming, tools for detecting errors in the source code and intelligent tutoring systems. Improving student retention, study habits, and learning experiences.

Hernan Witkin and the discovery of cognitive styles, made contributions to the development of a theory of field-dependence, field-independence cognitive styles; was the first to conceptualize a cognitive differentiation related to performance in front of tasks that different people could solve with different strategies. (Yáñez, 2009)

For Hernández, Neuroanatomically, with early stimulation, lived experience and personal interests, each individual develops the processes and competencies to learn as learning styles, said author applied the Kolb test with which he evaluates the ways of learning of each person. (Hernández, 2018)

Learning styles, impulsivity and reflexivity by Quiroga and Rodríguez where they explain that impulsivity helps students to be faster to solve problems, unlike reflective students who spend a lot of time analyzing problems to give them a solution. (Rodriguez, 2005)

According to Díaz-Barriga Arceo (2002), the use of didactic strategies focused on activating previous knowledge, highlighting relevant information, organizing, recirculating and integrating information, promote the construction of meaningful learning, which is characterized by being interesting, useful, motivating and have meaning for the students, in addition to seeking that the subjects have a high-level cognitive activity so that they re-signify the knowledge. If its application is promoted, it would facilitate the generation of authentic learning, of a high level of appropriation in which the learners will handle the contents widely.

Greaney & Kellaghan mentions national assessment capacity development has enabled ministries of education as part of their lead role to describe national levels of learning outcome, especially in key subject areas, and to compare achievement levels of key subgroups (such as boys and girls, ethnic groups, urban and rural students, and public and private school students). (Kellaghan, 2008)

Methodology to be developed

In this research it is sought that students carry out activities during their university course which leaves them learning that they can use in their personal and work life, through the authors who have investigated the subject, the main proposal of the work is supported and it was carried out the development of objectives, research questions and hypotheses which guide the course of the investigation.

The ILP-R Questionnaire Spanish version of (Schmeck, 1991) was used, which is already standardized, which is why the pilot test was omitted. From the data obtained, they are organized in a concentration matrix and they are given statistical treatment to explore the results where a cronbach's alpha of .92 is obtained, in addition, the information is processed in the analysis of the statistics:

ISSN 2524-2075

Descriptive from frequencies and percentages, Comparison with Student's t test for independent groups and with the Integrational one with exploratory factor analysis; It is a quantitative, synchronous and transversal investigation of an exploratory and descriptive type which will be processed in the STATISTIC program The instrument was carried out on-line for reasons of the contingency of COVID-19 this consists of two sections, in the first section there are ten general data variables. The second section consists of one hundred and fifty variables with a scale from 1 to 6 (1 = Strongly disagree; 6 = Strongly agree) directed to the axis of learning styles. The sampling is non-probabilistic of a systematic type; This being a characteristic in research by students, where they depend on their willingness to answer the survey online.

Results

Descriptive Analysis

The participating students are from different universities, among them we find that 78 participants belong to the male gender and 166 to the female, giving a total of 244. The age of this is from 17 to 45 years, with 19 years of age being the most frequent (58).

Comparative analysis

T Student's t for independent samples

In order to compare samples through their arithmetic means and find significant differences depending on the behavior, the following shows the comparative analysis with the student's t test for independent samples with a probable value of error less than 0.05 ($p < 0.05$), the statistical values that appear in this analysis are the sample values of each analysis group (Mean (X) of the groups), the t-test value (t-value), the degrees of freedom (df) and the probability of the error level.

For the first comparison, gender is taken as the grouping variable and the contrast variables that make up the section of the complex variable of the analytical "agentic" procedure. the men. It is inferred that men learn more actively and pragmatically as they tend not to be as theoretical and reflective as women.

For the second comparison, City is taken as the grouping variable and those that make up the section of the complex variable of the analytical "agentic" procedure as contrast variables. From the analysis it is observed that the Saltillo students believe that it is important to look at the problems rationally and logically, without drawing intuitive conclusions. Therefore, it is inferred that they learn in a reflective, theoretical and logical way, unlike the Potosinos.

For the second comparison, the grouping variable University career is taken and as contrast variables those that make up the section of the complex variable of Analytical "agentic" procedure. From the analysis it is observed that the students of the Law Degree prefer to work the problems in parts solving them part by part and they need to do things step by step, in an orderly way. It is inferred that the students of the Law Degree carry out their activities in an active, reflective, theoretical and logical manner.

Integrational Analysis

Exploratory factorial

In order to establish the structure that underlies the subjects studied, we work with a normalized varimax factor rotation, with a probable level of error $p \leq 0.01$ and an $r \geq 0.16$ and a confidence level of 99.99%; with the procedure multiple communities of r^2.

Next, the factors that support the educational innovation proposal are exposed.

The first factor is called Independent study, it explains 8.37% and is made up of the complex variables of thought, self-efficacy, data retention, motivation: academic interest, motivation: self-affirmation effort, study method, deep procedure: abstract / semantic, deep procedure: criterion thinking, elaborative procedure: self-realization, elaborative processing: concrete / episodic, "agentic" processing: serial / sequential, manual of impressions, the results show that students are interested in learning new content analytically, rote , verbal and visual. It follows that students are capable of creating their own knowledge without needing the teacher to teach topics and the role of this becomes only a guide that helps the young person.

In the second factor called counseling, it explains 7.59% of the total variance, it is made up of self-efficient organization, self-efficient thinking, self-efficient data retention, motivation: academic interest, motivation: personal responsibility, motivation: effort, self-esteem, self-affirmation, processing deep: abstract / semantic, elaborative processing: self-actualization, analytic "agentic" processing, literal repetition. The results show that students have difficulties in memorizing, feel confused, not easily bored, need guidance, and are not able to do things on their own. It is deduced that the students of striking activities in order to focus their attention on the classes and work as a team so as not to feel distressed, these students learn in a social and kinesthetic way what refers to the fact that the teachers of the universities of Mexico need to carry out their planning in based on these learning styles.

In the third factor called content retention, it explains 4.54% of the total variance, it is made up of self-efficiency organization, self-efficiency data retention, motivation: personal responsibility, motivation: effort, self-affirmation, study method, deep processing: abstract / semantic, deep processing: critical thinking, elaborative processing: self-realization, literal repetition, conventional attitudes, manual of impressions and random response scale. The results show that the students memorize what they have to learn and all the material, however they do not analyze what they are reading or think that it can be useful when reading and prefer that the teachers only limit themselves to giving the contents without giving their own contributions. I know deduces that students learn in a pragmatic-solitary way, which refers to teachers adapting their activities to help young people to be more outgoing and reflective so that they not only retain information, but can use it in their daily lives.

The fourth factor called logical effort explains 4.24% of the total variance and is made up of motivation: effort, deep processing: critical thinking, elaborative processing: self-realization, elaborative processing: concrete / episodic, "agentic" processing: serial / sequential, analytical "agentic" processing, and literal repetition. The results show that the students are analytical and need to have everything in order, they never leave anything unfinished, they solve problems logically and strive to obtain all the details of the content.

Conclusions

According to the results obtained from the statistical analyzes, this section presents the conclusions that show the perspective of learning styles; To answer the main question, objectives and hypotheses, it is concluded that students of striking activities in order to focus their attention on the classes and work as a team so as not to feel distressed, these students learn in a social and kinesthetic way what refers to the teachers from universities in Mexico need to plan based on these learning styles.

It is denoted that students are capable of creating their own knowledge without needing the teacher to teach topics and the role of this becomes only a guide that helps the young person.

It is denoted that students learn in a pragmatic-solitary way, which refers to teachers adapting their activities to help young people to be more outgoing and reflective so that they not only retain information but can use it in their daily lives.

It is concluded that university students learn logically and are inclined to the area of mathematics, so teachers must be more proactive at the time of teaching, that is, they need to give detailed content and precise instructions for carrying out activities.

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ISSN 2524-2075

Article **Journal-Health Education and Welfare**
December 2021, Vol.5 No.9 15-22

Functional rehabilitation and sports readaptation program in soccer patients between 17 and 20 years old after for reconstruction of anterior cruciate ligament

Programa de rehabilitación funcional y readaptacion deportiva en pacientes futbolistas entre 17 y 20 años de edad después de reconstrucción de ligamento cruzado anterior

SANTANDER-VELÁZQUEZ, Fabiola†*

Universidad Del Futbol y Ciencias Del Deporte. San Agustín Tlaxiaca, Hidalgo, Mexico.

ID 1st Author: *Fabiola, Santander-Velázquez* / **ORC ID:** 0000-0003-2670-0243

DOI: 10.35429/JHEW.2021.9.5.15.22 Received July 20, 2021; Accepted December 30, 2021

Abstract

In sport, the main mechanism of injury is related to mechanical force, which is characterized by its magnitude, location, direction, frequency, variability and speed of application. The knee is a frequent site of injuries in soccer, particularly in the ligaments, since they are structures that contribute significantly to the stability of the joint. The anterior cruciate ligament is the main stabilizer against the anterior displacement of the tibia on the femur. Providing 87% of the resistance against this displacement when the knee is at 30° of flexion, in addition, the anterior cruciate ligament acts as a secondary stabilizer against valgus tension during full extension.

Functional rehabilitation, Sports readaptation, Anterior cruciate ligament

Resumen

En el deporte, el principal mecanismo de lesión se encuentra relacionados con la fuerza mecánica, la cual se caracteriza por su magnitud, localización, dirección, frecuencia, variabilidad y velocidad de aplicación. La rodilla es una localización frecuente de lesiones en fútbol, en particular en ligamentos, ya que son estructuras que contribuyen de manera importante a la estabilidad de la articulación. El ligamento cruzado anterior es el principal estabilizador frente al desplazamiento anterior de la tibia sobre el fémur. Proporcionando el 87% de la resistencia contra este desplazamiento cuando la rodilla se encuentra a 30° de flexión, además, el ligamento cruzado anterior actúa como estabilizador secundario contra la tensión en valgo durante la extensión completa.

Rehabilitación funcional, Readaptación deportiva, Ligamento cruzado anterior

Citation: SANTANDER-VELÁZQUEZ, Fabiola. Functional rehabilitation and sports readaptation program in soccer patients between 17 and 20 years old after for reconstruction of anterior cruciate ligament. Journal-Health Education and Welfare. 2021. 5-6:15-22.

* Author Correspondence (Email: franblancoe@hotmail.com)
† Researcher contributing as first author.

Introduction

The anterior cruciate ligament (ACL) is a structure that plays a fundamental role, since it ensures the normal function of the knee. This ligament is stretched or torn in 70% of all severe knee injuries (Tortora & Derrickson, 2006).

Seco (2016) describes that the anterior cruciate ligament is a cordonal ligament with very little elongation power and with no healing capacity, since when it breaks its ends retract.

Sports rehabilitation of an injury such as the anterior cruciate ligament requires not only the complete restoration of the functional performance of the knee joint, but also includes the maintenance of the athletic physical capacities of the athlete, through their work according to a training plan. modified according to the characteristics and time of the injury, which helps in the same way that the athlete feels safe and without fear when returning to their sports activities in their team.

In this way, the model of a treatment plan for a sports injury is very similar to a training plan, with additions from the psychology area that allow the athlete to be prepared for full integration into the activity and the necessary physiotherapy on the pathological focus. , considering the treatment, and the surgical technique, as well as the recovery time necessary for the footballer to fully reintegrate into his sporting life.

That is why there must be a set of designed strategies that are framed in the area of injury re-adaptation, which is understood as the set of medical-therapeutic and physical-sports measures aimed at preventing the risks of injury, reestablishing and developing health sports and improve or optimize the athlete's performance to enable a greater sports life (Lalín & Peirau, 2011).

The intervention systems for the physical preparation of the current soccer player are based on optimizing in isolation each of the components that make up the structure of the athletes' performance, such as coordinative, conditional and cognitive elements, which could be applied to injured patients, who require a longer recovery time, this as long as the patient's own physiological principles of recovery are respected, taking into account the work and the physiotherapeutic objectives.

In various texts related to the physiotherapeutic objectives, they greatly emphasize that the knee must have an adaptation process prior to the reintegration of the athlete through techniques related to physical preparation and sports training, as well as techniques of physical rehabilitation, taking into account various biological processes suffered by the postoperative patient, to avoid generating damage to the graft of the same.

It is necessary to propose and validate theoretical methodological elements that explain how to link sports rehabilitation and sports rehabilitation that allow contributing to the reintegration process to sports training but considering the stages of ligamentization to avoid damage to the graft and optimize the rehabilitation of the athlete.

This research aims to carry out a functional rehabilitation and sports rehabilitation program that considers the ligamentization process necessary to improve the reincorporation process of a soccer athlete in the sports field, in which the objectives and methodological aspects of two areas of the sport are considered. knowledge that involve the readaptative process of the patient, such as physiotherapy and physical preparation or sports training.

Anterior cruciate ligament injury

The knee is a frequent site of injuries in soccer, particularly in the ligaments, since they are structures that contribute significantly to the stability of the joint (Kolt & Snyder, 2004).

In this sense, the anterior cruciate ligament:

ISSN 2524-2075

> "It is the main stabilizer against the anterior displacement of the tibia on the femur, providing 87% of the resistance against this displacement when the knee is at 30 ° of flexion, in addition, the anterior cruciate ligament acts as a secondary stabilizer against tension. valgus during full extension" (Kolt & Snyder, 2004).

Therefore, the anterior cruciate ligament is a structure that plays a fundamental role, since it ensures the normal function of the knee (Scott, 2007). However, for Tortora & Derrickson (2006), the ligament is stretched or torn in 70% of all severe knee injuries.

The most frequent injury mechanism in the anterior cruciate ligament is described by Álvarez et. to the. (2008):

> "It is the rotation of the femur on a fixed tibia, that is, when the foot is supported, during an excessive or forced valgus movement. Hyperextension of the knee is also common, isolated or in combination with internal rotation of the tibia, however, recently ACL injuries have been observed during forced knee flexion, so it can be considered a third mechanism of injury ".

Surgical treatment after an anterior cruciate ligament injury

Currently, to replace a broken anterior cruciate ligament of an athlete patient, a ligamentoplasty is performed, which is the replacement of the ligament by a tendon, with an autologous graft, that is, tendons from the patient himself or with a cadaver graft.

The two most used techniques are: the one that uses the central third of the patellar tendon as a plasty (bone - tendon - bone or HTH) or the one that performs a plasty with the tendons of the goose foot (double semitendinosus and internal rectus or T4).

Both techniques attempt to reproduce the anatomy of the anterior cruciate ligament, and for this, tunnels are made in the tibia and femur to introduce the implant, anchoring them to the bone with different fixations (Seco, 2016).

Ligamentization process after anterior cruciate ligament surgical procedure

Living tissues and organs are dynamic, they change their mechanical properties and structure, in response to stress alterations as a phenomenon of their functional adaptation and seeking optimal activity. This model is known as the remodeling process.

Tendons and ligaments have the ability to adapt to new working conditions in response to changes in tension and movement within suitable working conditions.

The functional adaptation that takes place in a tendon graft after 30 weeks to become the ligament it replaces was called "ligament." This is the integration process of the plasty, that is, the ligamentization, it is the process by which a tendon is transformed into a stabilizing ligament with the same shape as the ACL, following the well-known "law of functional adaptation" established by Roux, at the end of the 19th century.

In short, ligamentization is a process by which a tendon transplant, after implantation, is modified to give rise to a neoligament. For Quelard, Rachet, Sonnery-Cottet and Chambat (2010), this transformation consists of the following stages:

- From 0 to 2 months: cell colonization phase during which there is an increase in fibroblasts and inflammatory cells and the formation of neovessels from the periphery of the graft. In the transplant, small areas of degeneration of the collagen fibers are seen. A synovial neomembrane surrounds the graft after the third week.

- From 2 to 12 months: rapid collagen remodeling phase, during which the increase in fibroblasts is maximum and their activity is very intense. In addition, areas of degeneration are observed. The organization of collagen fibers and their vascularization begin in the sixth month. After 1 year, the biochemical components of the transplant are those of a ligament.

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- From 1 to 3 years: maturation phase during which the cellularity and vascularization of the graft slowly decrease. At 3 years, the histological and biochemical structure of the transplant is similar to that of a normal anterior cruciate ligament and the differences only concern the proportions of some elements and the lack of innervation.

After the ligamentization phases have been completed, the mechanical performance of the transplant decreases its initial resistance by up to 50%, therefore, an excessive increase in loads is capable of causing elongation or rupture of the graft, on the other hand, an increase in loading is necessary for collagen to mature and organize (Quelard, 2010). For this reason, it is extremely important to consider these phases when planning a rehabilitation and rehabilitation program for the athlete patient.

Rehabilitation and readaptation of the anterior cruciate ligament in soccer players

Rehabilitation after anterior cruciate ligament reconstruction has undergone very important changes in recent decades as a result of new scientific knowledge and clinical observations, which have allowed the development of more aggressive protocols to accelerate the rehabilitation process.

Sánchez, Fernández, Llorensí, Pérez, Soto (2009), mention that accelerated rehabilitation protocols have shown better results, as long as the minimum recovery period of 6 months is respected, compared to classic rehabilitation protocols, whose main characteristics are long periods of immobilization, and very gradual muscle reinforcement kinesitherapy. And the basic principles of these rehabilitation protocols are: control of pain, effusion and edema. mobilization and early loading of the limb, specific kinesitherapy that does not produce excessive tensions in the plasty, exercises in a closed kinetic chain, proprioceptive neuromuscular re-education, and finally rapid reincorporation to sports practice and / or activities of daily life.

The sports rehabilitation of an injury such as the anterior cruciate ligament requires not only the complete restoration of the functional performance of the knee joint, but also includes the maintenance of the athletic physical capacities of the athlete, through their work according to a modified training plan. according to the characteristics and time of the injury.

In this way, the model of a treatment plan for a sports injury is very similar to a training plan, with the addition of the necessary physiotherapy on the pathological focus, considering the treatment, and the surgical technique, as well as the recovery time. necessary for the footballer to fully reintegrate into his sporting life.

On the other hand, the time taken by the athlete in his recovery must be considered, since the footballer will be unable to train with his sports team, and that his physical capacities, mainly of a conditional type, will be affected, in addition to the importance of taking care of the anterior cruciate ligament graft, to prevent damage to the graft. Hence the importance of comprehensive work that two large areas of knowledge can provide, such as physiotherapy and physical preparation.

In this sense, Lloret (1989) conceptualizes that sports rehabilitation is the basic entity of sports medicine, which is based on the application that kinesitherapy provides.

It is essential to consider that in order to develop a rehabilitation protocol, theoretical and methodological aspects must be considered dominated by professionals in physical preparation and sports, with the approval of the sports doctor and physiotherapist, guaranteeing the biological recovery times of the injury, as well as the development of the physical and technical capacities of soccer.

And currently there is little documentation focused on retraining and on the tasks planned by the physical trainer or retrainer. Almost all of the studies investigate from a sports medicine perspective and not from a physical education and sports perspective. (Caraffa, Cerulli, Projetti, & Aisa, 1996; Ramos *et al*., 2008).

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Various authors mention that the readaptative process must be based on the principles of reeducation, with a correct prescription of exercises, which may well be organized in different phases, respecting the biological processes of physiological and anatomical recovery.

Ageberg (2005) considers that sports rehabilitation is understood as the set of medical-therapeutic and physical-sports measures aimed at preventing the risks of injury, reestablishing and developing sports health and improving or optimizing the athlete's performance to enable a longer life sporty.

Material and methods

It is essential to explain that the functional rehabilitation and sports rehabilitation program in soccer players between 17 and 20 years of age after anterior cruciate ligament surgery is based on the traditional planning of soccer training, considering the ligamentization phases of the graft, in order to identify the elements to consider that allow us to validate said proposal, in addition to knowing the areas of opportunity, as well as the methodological elements, which must be taken into account to apply this type of work proposal.

Injured footballers will begin rehabilitation as soon as possible with specific interventions aimed at reducing pain, inflammation, regaining range of motion, proprioception, and increasing conditional physical abilities, while specific gestures are attempted to be introduced early, but taking into account the time of injury, and the physical limitations that the graft presents, to avoid affecting it.

It will work with 5 phases, since it takes into account the rehabilitation objectives that represent a progress in the treatment and physiological adaptations to the injury, as well as the objectives of sports training that are focused on improving sports performance through work in conditional and coordinative capacities.

Phase 1: Diagnosis and medical treatment

At this stage, the moment in which the footballer is injured, the medical diagnosis, including the performance of the imaging studies, as well as the surgical intervention are considered, ending this stage when the patient arrives at the physiotherapy area.

Phase 2: Physiotherapeutic treatment and maintenance of sports form

This phase lasts approximately 8 weeks, in which the graft undergoes the first two phases of ligamentization, which are the necrosis phase and the coating of the synovial membrane. In this phase, greater importance is given to the rehabilitation area and according to the physiological recovery times, the main objectives in the rehabilitation and physiotherapy area will be to decrease pain and inflammation, as well as gradually recover the optimal range of motion, as well as work unloading exercises in order to gradually remove the accessories for support as well as re-education of the gait and treatment of the scar. On the other hand, the rehabilitation area will enter this phase with the acquisition stage, where it seeks to develop the foundations for the sports form, produce the accumulation of multilateral motor and coordinative capacities, that is, a general motor development.

Phase 3: General re-adaptation

During this phase, the graft is undergoing complete revascularization, spanning the third month to the sixth month. Sports rehabilitation is taking more importance. The physiotherapy area will modify and decide which objectives it is going to treat depending on the needs of the patient. While the rehabilitation area enters a stabilization stage where the gradual improvement of the level of preparation is sought, consolidating the stability of the preparation and improving the results in competitive performance.

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Phase 4: Specific re-adaptation

The graft is in the last phase of ligamentization, which is the remodeling of the implant, however this stage lasts up to 18 months, but the risk that the graft suffers some type of damage decreases considerably. In this phase, it is intended that the athlete perform exercises with technical and tactical gestures with a higher level of complexity, getting closer and closer to the physical demands of the sport.

Phase 5: Total integration to the team

In this phase, the aim is for the soccer player to fully integrate with his team, while in the re-adaptation area the training of high loads will be interrupted, facilitate active recovery and renew the athlete's adaptation reserves.

PHASE I	
Objetives	Diagnosis and medical treatment
Activities	Pruebas ortopédicas, estudios de imagen

Table 1 Phase I. Functional rehabilitation and sports rehabilitation program in soccer patients between 17 and 20 years of age after anterior cruciate ligament reconstruction

Phase	Phase I Physiotherapeutic treatment and maintenance of sports form							Phase II General readaptation												Phase IV Specific readaptation						Phase V Reinsertion	
Month	1				2			3				4				5				6			
Week	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
Ligamentization	Necrosis				Synovial membrane invasi			Complete revascularization												Implant remodeling						
Physiotherapeutic goals	Treatment of pain and inflammation																									
	Optimal ranges of motion																									
	Download exercises				Preparation for full support without attachments																					
	Stitch caution				Scar management																					
Stages of training	PREPARATORY								COMPETITIVE															TRANSIENT		
	P. General				Specific P.				Preconpetitive						Competitive									Transep reflection		
Training phases	ACQUISITION								STABILIZATION															TEMPORARY LOSS		
Endurance	Development of general resistance				Developing the fundamentals of specific resistance				Development of specific resistance							Improvement of specific resistance								Maintenance of general resistance		
	The Phase supposes the predominance of the contents of the continuous method with moderate intensity, with a progressive increase in the volume of the loads in the athlete adapts. Resistance work targets all parts of the body and involves the large muscle groups. There is an almost total predominance of aerobic endurance.								A high intensity is the parameter of the load object of emphasis, exceeded many times even the speed or volume of the competition itself. The alternation of intensities facilitates a correct recovery between the preparation sessions and allows to reach the optimal form for the main competitions.													Maintain basic levels of general resistance.		
	Continuous (uniform, variable), fractional, interval (extensive)								Flushing, base games, reps															Flushing, base games, reps		
	Bicycle (free speed decided by the patient)					Bicycle and elliptical (progressive increase in time and speed).			Exercises on the court (changes of pace, exercises with sustained speed). LINEAR WORK											Sustained speed exercises, base games, tight spaces, competitive exercises. ADDRESS CHANGES				Running technique exercises, changes of pace, elliptical, bicycle, treadmill, field exercises.		
	High volume, 50% intensity, 2- 2 recovery				Intensity 40-70%, recovery, 1: 1, 2: 1, 3: 1				Intensity 70-80% short recovery time, introduce technical and tactical gestures.							Intensity 80-90% short recovery time, introduce technical and tactical gestures.					Intensity 80-90% short recovery time, introduce technical and tactical gestures.				Reduce loads, take into account work with the team		
Strength	Strength/building stage				Development of maximum strength				Conversion of maximum force to specific force							Maintenance of the specific force stage										Creation of Readaptive Training		
	Its goal is the overall development of the fundamentals of strength, injury prevention, and building a solid foundation that prepares you for the next phase. It is a stage of predominance of volume and resistance work in general.				The objective of this Phase is the development of maximum strength at the highest possible level according to the athlete's ability. A phase of muscular development and another of intramuscular coordination will be carried out first.				Its objective is the gradual conversion of the specific force necessary in soccer							The objective is to maintain the specific strength levels achieved during the previous phases. The between supposes five weekly sessions.										Considerable weight reduction, as well as the number of stimuli per session.		
	Cervical, isometric, self-loading				Isometric, overhead, isotonic				Contrasts, overloads, isometric							Selfloads, overloads, isometric, pyramidal, isotonic, contrasts, pliometrics, eccentric.										Isometric, isotonic		
	Closed kinetic chain (The distal segment remains fixed)											Open kinetic chain (the distal end performs the movement)				Open and closed kinetic chains (free use, progressively increasing the weight											
	Exercises with a predominance of the hip					Exercises with a predominance of the hip but gradually introduce exercises with the knee joint						Exercises with a predominance of the hip but gradually introduce exercises with the knee joint				Exercises with a predominance of the hip but gradually introduce exercises with the knee joint										Considerable weight reduction, as well as the number of stimuli per session.		
									Short levers											Long lever								
	It involves work with little weight, with a long execution time, high number of repetitions, and with active pauses working another body segment.				Truncated pyramidal (low intensity, increasing the number of repetitions), ascending pyramidal (higher intensities, and decreased repetitions).				The exercises chosen must simulate the specific phases, direction and angles in which the technical gestures are performed, involving the main agonist muscles involved in them.							Combine the objectives of the previous phases, alternating weekly sessions and taking into account the recovery of between 36 and 72 hours.								
Flexibility	Development of general flexibility																			Development of specific flexibility						Maintenance of general flexibility		
	Increase in the levels of flexibility of the athlete in general																			Increase specific flexibility levels						Maintain specific flexibility levels		
	Static assisted							PNF, dynamic, static																		Static, Dynamic		
Speed	Creation of aerobic base				Anaerobic base creation				Creation of aerobic base							Developing the fundamentals of specific speed				Refinement of specific speed								
	Build a solid aerobic base that later makes it possible to quickly recover from the intense specific work				An anaerobic base must be built, closer to the specificities of speed. Specific means of the sport practiced must be used.				It assumes the accentuated construction of the capacities of reaction, acceleration, maximum speed and resistance to the speed. As the competition period approaches, the training begins to be more and more intense and specialized.							It assumes the accentuated construction of the capacities of reaction, acceleration, maximum speed and resistance to the speed. As the competition period approaches, the training begins to be more and more intense and specialized.								
	It works with resistance				• Running technique, stride and optimal accelerations				Frequency, starts and ramps, ascending slopes							Resistance exercises, multi-				Specific sports situations are used, which will increase the automation of specific gestures						Specific work with the competitive team		
	• The intensity of the exercise should be chosen in such a way that it reaches very high levels, essential for the development of speed. • The duration of exercise should not decrease because of the onset of fatigue. • The volume of the exercise should be limited between 3 and 10 repetitions. Speed should not be developed in a state of fatigue. • It is necessary to choose a distance that corresponds to the level of performance of the sprinter in this area (about 35-55m) if you want to work the maximum speed is reached approximately between 20 and 45m. • All speed training should be done in an optimal state of warm-up.																											
Neuromuscular and neuropropioceptive control	Static propioception								Dynamic propioception															Mixed propioception					
	Propioception in sitting position				Standing pyoception with and without visual stimuli				Static propioception in standing with and without visual stimuli, as well as auditory, and cognitive, with an unstable surface				Dynamic propioception on unstable Surface				Dynamic propioception with unstable surface and with implements				Dynamic and static exercises with technical gestures involved						
CORE exercises	CORE isometric								Isometric exercises with unstable Surface				Dynamic CORE exercises							Dynamic CORE exercises with unstable surfaces and implements								

Table 2 Phase II to Phase IV. Functional rehabilitation and sports rehabilitation program in soccer patients between 17 and 20 years of age after anterior cruciate ligament reconstruction

Conclusions

Currently, an injury with the characteristics of the rupture of the anterior cruciate ligament places the footballer at a severe disadvantage, either due to lost time, or due to the complexity of the re-adaptation and rehabilitation process that this type of injury entails. leads to wanting to accelerate the recovery processes, and despite the fact that there are various rehabilitation protocols, these are directed with a medical approach, without specifying or deepening on the loss of conditional and coordinative physical capacities that occurs due to the time of injury, in this way, an area of opportunity can be found, where it can be complemented through two large areas such as physical preparation and physical rehabilitation, and create a tool that enhances sports rehabilitation while recovering capacities physical losses, respecting recovery times, with the help of specific objectives you are looking for in the physiotherapy area.

It is important to emphasize that the times established in this program are estimated, that is, they are not absolute, since it must be remembered that each patient has a different evolution and recovery time, and it is important to remember that each work methodology must be individualized. It is used with patients with any type of injury.

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Article **Journal-Health Education and Welfare**
December 2021, Vol.5 No.9 23-34

Study of graduates of the engineering career in industrial maintenance of the Universidad Tecnológica del Norte de Aguascalientes

Estudio de egresados de la carrera de ingeniería en mantenimiento industrial de la Universidad Tecnológica del Norte de Aguascalientes

VAZQUEZ-GUTIERREZ, Rosa Inés†* & MÉNDEZ-MACÍAS, Gerardo

Universidad Tecnologica del Norte de Aguascalientes. Mexico

ID 1st Author: *Rosa Inés, Vazquez-Gutierrez* / **ORC ID:** 0000-0001-8774-7737, **Researcher ID Thomson:** X-2867-2018

ID 1st Co-author: *Gerardo, Méndez-Macías* / **ORC ID:** 0000-0001-9141-656X

DOI: 10.35429/JHEW.2021.9.5.23.34 Received July 25, 2021; Accepted December 30, 2021

Abstract

The present study of Graduates of the Industrial Maintenance Engineering career of the Universidad Tecnológica del Norte de Aguascalientes seeks to show a panorama of the situation of the graduates of this University. A study of graduates allows us to obtain the necessary information on the impact that the education that graduates acquired while they were students has had, likewise allows us to know specific problems in the market and find areas for improvement in the educational system of our university. The analysis of a graduate study will allow to have a strategic vision in the short, medium, and long term for the competent authorities of our institution, as well as to show current and future students the validity of their career through the opinion of our graduates.

Education, graduates, UTNA, Quality, Maintenance engineering

Resumen

El presente estudio de Egresados de la carrera de Ingeniería en Mantenimiento Industrial de la Universidad Tecnológica del Norte de Aguascalientes busca mostrar un panorama de la situación de los egresados de esta Universidad. Un estudio de egresados permite obtener la información necesaria del impacto que ha tenido la educación que los egresados adquirieron mientras fueron estudiantes, así mismo nos permite conocer problemas específicos en el mercado y encontrar áreas de mejora en el sistema educativo de nuestra Universidad. El análisis de un estudio de egresado permitirá tener una visión estratégica a corto, mediano y largo plazo para las autoridades competentes de nuestra institución, así como permite mostrar a los estudiantes actuales y a los futuros la validez de su carrera por medio de la opinión de nuestros egresados

Educación, Egresados, UTNA, Calidad, Ingeniería en mantenimiento

Citation: VAZQUEZ-GUTIERREZ, Rosa Inés & MÉNDEZ-MACÍAS, Gerardo. Study of graduates of the engineering career in industrial maintenance of the Universidad Tecnológica del Norte de Aguascalientes. Journal-Health Education and Welfare. 2021. 5-6:23-34.

* Author Correspondence (Email: rosa.vazquez@utna.edu.mx)
† Researcher contributing as first author.

Introduction

This report presents a study of Graduates of the Industrial Maintenance Engineering Career of the Universidad Tecnológica del Norte de Aguascalientes.

A survey was conducted to determine the most important parameters to measure on the information of the graduates.

The areas that were considered during this study were:

- General data.
- Employment situation.
- Aspects of the Industrial Maintenance Engineering career.

The results of the survey applied to a sample of 36 students from the generations 2015 to 2019 are shown below.

This project benefits the Universidad Tecnologica del Norte de Aguascalientes since it allows it to know the most important information about its graduates.

Methodology

According to Hernández Sampieri (2010), the study that was applied was a "Quantitative Exploratory" study where a survey-type data recovery tool was used where a series of questions about the IME career were specified and the survey was applied to a large number of our alumni in order to gather data or to detect public opinion on a given matter.

The objective is to evaluate labor-related information regarding the conditions and needs of the program graduates, through applied surveys.

The aim is to interview graduate students using the information obtained in the surveys and interviews carried out by the aforementioned teachers to the students of public and private companies.

The survey is divided into 3 sections:

I) General data

II) Employment situation

III) Aspects of the Industrial Maintenance Engineering career.

It consists of a total of 34 questions.

Sampling

The type of sampling that was carried out was stratified.

The advantage of this type of sampling is that it tends to ensure that the sample adequately represents the population based on selected variables. It also allows more precise estimates to be obtained and its objective is to obtain a sample as similar as possible to the population in terms of the stratified variable (s). The result was a sample of 36 students from the generations 2015 to 2019. The survey was applied from April to June 2020.

Background

The Universidad Tecnológica del Norte de Aguascalientes is part of the Subsystem of Technological Universities (UUTT). It was created in 2000 and is located in the Municipality of Rincón de Romos, in Aguascalientes, Mexico. It has two fundamental purposes:

a) Relocate the higher education services of the State of Aguascalientes, adapting them to the geographic distribution of the population.

b) Contribute to the diversification of the higher education offer in the entity.

Currently, apart from its programs at TSU, the university increased its educational offer by opening the Bachelor level in four of its programs:

- Accountancy
- Productive Systems
- Mechatronic
- Industrial maintenance
- Software Development and Management

ISSN 2524-2075

- Virtual Environments and Digital Businesses
- Sustainable and Protected Agriculture / Plans and objectives
- Human Capital Management
- Business and Marketing Innovation
- Metal Mechanics
- Business and Project Management
- Design and Management of Logistics Networks [1]

The objective of the career in Industrial Maintenance Engineering is to provide a quality education to train Industrial Maintenance Engineers with leadership skills, communication and collaborative work; with skills to design strategies to optimize maintenance activities through reliability tools and the integration of new technologies in the implementation of maintenance projects and / or technological and / or social entrepreneurship; committed to their professional and work development, with a high sense of social responsibility. The degree has a duration of 3.8 years [2].

According to Cabrero, E. "The new world economy is characterized by having an important component related to the knowledge economy. In other words, it is based on its dynamics in the creation of markets where ideas, processes and diverse knowledge are offered around the systems of production of goods and services ". Hence the importance of carrying out a study of graduates of the UTNA, as it is important to have knowledge of what the progress of the graduates of this university is. [3] The student was the one who received the education in the teaching institution, he is the main actor of the learning process. [4]

Education varies according to the conception of the world and of man, therefore it must be considered that education is proposed, fundamentally to transmit to the new generations a certain culture and specific knowledge and prepare them, in addition to the assimilation of new techniques, generally the result of technological changes[5].

For this reason, during this study a comparison was made on the real application of some subjects in the work life of graduates.

The industrial maintenance according to Navarro, L. has to ensure the operation at any cost. Faults and their solutions are being studied, leading to a great technical advance. [6]

According to López, M. the quality has 3 supports:

- Evaluation, in terms of prior, simultaneous and subsequent knowledge. Reliable action support in the right direction.
- Planning, as a resource that systematizes those aimed at improvement. Essential requirement of a job well done.
- Innovation as new values are incorporated or existing ones are improved, in the direction of the improvement learned[7].

Therefore, considering the last three quality supports, it is considered that this study of graduates is important for the UTNA because it will allow it to evaluate its graduates in order to plan and subsequently carry out an innovation in their teaching processes.

Background of the career in industrial maintenance engineering

Mission

Provide a quality education to train Industrial Maintenance Engineers with leadership, communication and collaborative work skills; with skills to design strategies to optimize maintenance activities through reliability tools and the integration of new technologies in the implementation of maintenance projects and / or technological and / or social entrepreneurship; committed to their professional and work development, with a high sense of social responsibility.

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Vision

To be an educational program in the area of Industrial Maintenance, recognized for its relevance and quality standards with a high level of acceptance of its graduates in the labor field; for being a pioneer in the implementation of new technologies; be strongly linked to the business sector and offer a comprehensive training proposal for its students under a sustainable approach and social responsibility, aligned to the needs of specialized human resources demanded by the social, productive and services sector, with the skills to generate solutions innovative solutions to the problems faced by organizations as a result of globalization and technological changes.

General Objectives of the Educational Program:

Prepare industrial maintenance engineers for the successful practice of conservation, comprehensive optimization of equipment and facilities through their ability to analyze, manage, control and evaluate the master maintenance plan, increasing reliability, availability and maintainability of equipment and the efficient use of economic, technological and human resources.

Educational Objectives:

EO1. The graduates evaluate the information of the technological factors by means of protocols and maintenance techniques to guarantee the availability of the equipment.

EO2. The graduates apply predictive maintenance techniques to increase availability and guarantee the correct operation of the company's equipment and facilities.

EO3. The graduates manage the efficient use of energy, technological and / or human resources, based on industrial and environmental safety standards, contributing to the optimization of processes.

EO4. The graduates analyze, design, manage and control the maintenance master plan by establishing maintenance policies and protocols.

Egress Attributes:

EA1. Identify, formulate and solve engineering problems in industrial maintenance applying the principles of basic science and engineering

EA2. Apply, analyze and synthesize production processes by designing maintenance strategies considering technical and economic factors and by managing quality systems.

EA3. Experiment, analyze and interpret data using engineering judgment for decision making.

EA4. Communicate effectively in a clear and detailed way, on concrete and abstract topics in their professional and sociocultural context.

EA5. Act with proactive values and attitudes of excellence in their personal, social and organizational development, in harmony with their environment.

EA6. Recognize the permanent need for updating and training to locate, evaluate, integrate and apply this knowledge in areas of maintenance engineering.

EA7. Directs and / or participates in work teams by defining their characteristics, coordinating efforts and evaluating their achievements, to contribute to the development of the organization.

Admission profile

1. Design maintenance strategies through the analysis of human, technological, economic and financial factors, for the preparation and administration of the maintenance master plan that guarantees the availability and reliability of the plant, contributing to the competitiveness of the company.

2. Optimize maintenance activities and equipment operating conditions through reliability techniques and tools to increase the overall efficiency of equipment and reduce maintenance costs to support the sustainability and competitiveness of the company.

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Graduate Profile

1. Manage maintenance activities by integrating the master plan, to ensure operation and contribute to the productivity of the organization.

2. Supervise the replacement or manufacture of parts of electromechanical systems in machinery, equipment and industrial distribution networks, using standards to maintain the systems in optimal conditions.

Professional Occupations

Plant manager

Maintenance manager

Maintenance leader

Maintenance manager

Supervisor or Maintenance Manager

Maintenance engineer

Performance Scenarios

- Dedicated public and private companies from the primary, secondary and tertiary sectors such as: Mining, Fishing and Agriculture.

- Metalworking, food, plastic, chemical, clothing, aeronautical, automotive, electrical appliance, pharmaceutical companies, among others.

- Service companies such as hotels, hospitals, etc.

- Your own Industrial Maintenance company.

Syllabus

First quarter	**Second quarter**	**Third quarter**
Linear algebra	Mathematical functions	Diferential calculus
Basic chemistry	Physical	Probability and statistics
Introduction to maintenance	Electricity and magnetism	Thermodynamics
Security and environment	Maintenance management	Electric systems
Technologies for digitalization	Quality in maintenance	Machines and mechanisms
Personnel administration	Industrial drawing	Electronic analogue
English i	Working methods and systems	Integrator i
Oral and written expression i	Costs and budgets	English iii
Sociocultural training i	English ii	Sociocultural training ii

Fourth quarter	**Fifth quarter**	**Sixth quarter**
Integral calculus	Electrical installations	Industry intership
Structure and properties of materials	Thermal machines	
Electric machines	Manufacturing process maintenance	
Industrial services networks	Automation and robotics	
Digital electronic	Materials engineering	
Programming principles	Integrator ii	
Pneumatic and hydraulic systems	English v	
English iv	Oral and written expression ii	
Sociocultural training iii	Sociocultural training iv	

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Seventh quarter	Eighth quarter	Ninth quarter
Math for engineering i	Math for engineering ii	Strategic management for maintenance
Physics for engineering	Tpm and rcm techniques	Mechanical predictive maintenance
Operation and maintenance protocols	Destructive tests	Automated systems and industrial networks
Tribology	Integrator i	English viii
English vi	Environmental management	High performance team management
Planning and organization of work	English vii	Ninth semester
Time management	Eighth quarter	Strategic management for maintenance

Tenth quarter	Eleventh Quarter
Non destructive essays	Industry intership
Visualization and control of processes	
Integrator ii	
Technology and service projects	
English ix	
Business negotiation	

Figure 1 Syllabus

Results

The results of the survey that was applied to our graduates are shown below in order to determine the characteristics of their jobs and with this to determine actions to improve the design of the study plan and the areas of opportunity that exist in the subjects that have been taught to them, likewise you can see a more complete picture of what the real situation of our graduates is like when they go out to work.

I) General data

The follow-up of graduates allows the university to obtain concise and accurate information about the job placement process, both about their job performance and their professional career.

In this section, age, sex, marital status, name and email were considered as questions, only that due to confidentiality of the data the name and email will not be published.

a. Age

The age of the surveyed students ranges between 22 and 25 years.

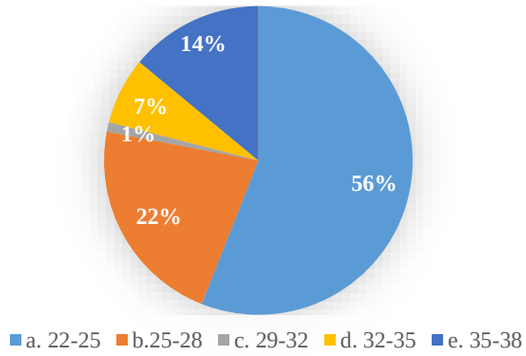

Figure 2 Age of the surveyed graduates

b. Sex

The composition by gender of the degree in Industrial Maintenance Engineering surveyed corresponds to 22% female and 78% male.

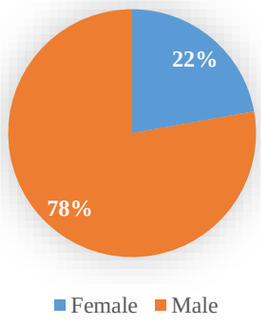

Figure 3 Sex of the graduates surveyed

c. Marital status

Regarding the marital status of the graduates surveyed, the single category stands out with 61%; while 28% are married and 8% are in common law union.

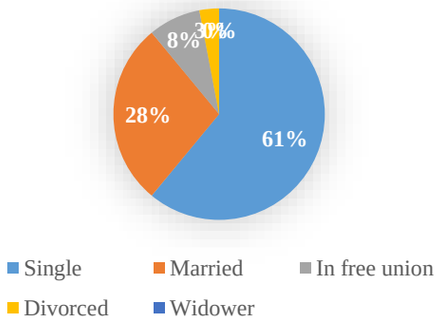

Figure 4 Marital Status of the graduates

II) Employment situation

The most important items on the current situation of our graduates are shown below. In this area, they were asked if they worked, monthly income, number of hours worked per week, duration of work, as well as their current job position.

a. Current job

During the survey, the students reported that 94% were working.

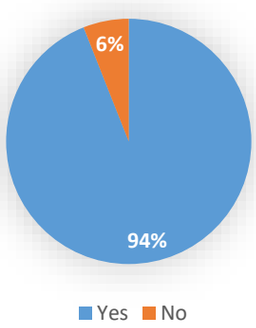

Figure 5 Employment situation

b. Monthly income

The item that stands out in the monthly income is $ 10,001 to $ 15,000 with a percentage of 36 %, while there is also a percentage of 14% that mentions earning more than $ 20,000. Likewise, there is a 22% earning from $ 15,001 to $ 20,000.

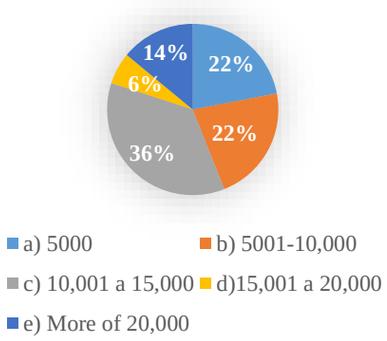

Figure 6 Monthly income

c. Number of hours worked per week

The average number of hours worked per week is 50 hours, followed by 30.6%, 45 hours per week.

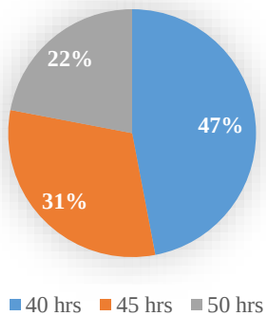

Figure 7 Number of hours worked

d. Working time

The length of work that graduates have varies is highly variable, stands out with 22% from 6 months to 1 year. However, there is a percentage of 19% who have worked in the same place for more than 5 years.

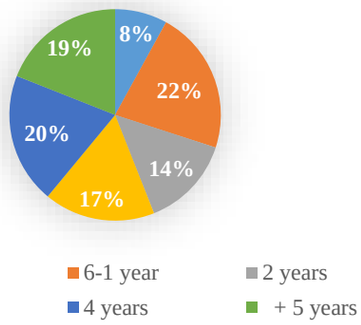

Figure 8 Working time

e. Main activity done at work

The area in which most of our graduates work is as Maintenance Technician, this is 50%, while 28% are working as Maintenance Administrators, and 19% are working as Maintenance Supervisor and only one 3% have achieved a management.

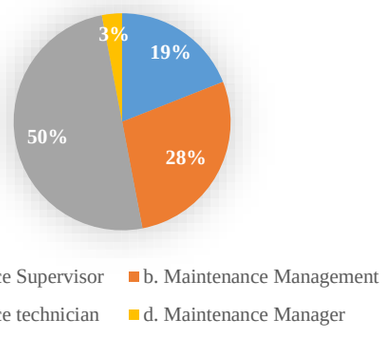

Figure 9 Main activity done at work

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f. Primary means through which you found current employment

The graduates found work in 47% by sending CV, while in 31% the students found work after having made their stay in the company, likewise 22% found work by recommendation.

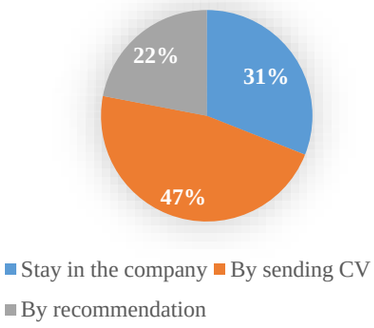

Figure 10 Primary means through which you found current employment

g. In addition to your job, do you have any other paid activity?

83% of graduates have an extra exit to their normal job.

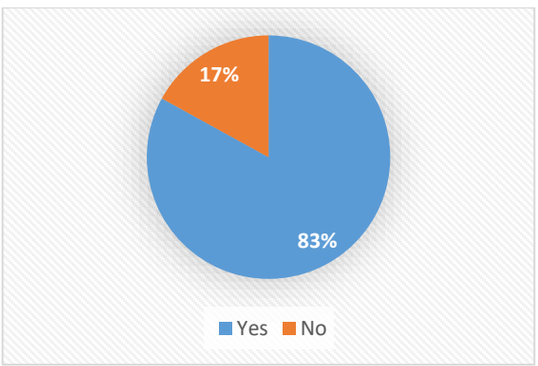

Figure 11 Extra paid activity

h. Coincidence of work with what you studied

86% of the graduates surveyed mentioned that their career coincides with their work, however 14 % stated that their work does not coincide with what they studied.

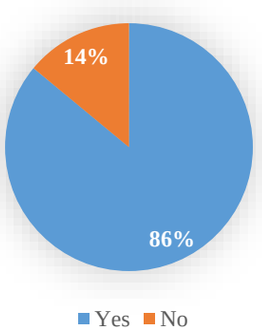

Figure 12 Coincidence of work with what you studied

i. Below is a comparative table of the level of satisfaction of the respondents with their work

Entry	Totally satisfied	Regular	Little
a) Put into practice the knowledge acquired in the bachelor's degree.	56.4%	28.2%	15.4%
b) The possibility of making your own ideas	76.9%	20.5%	2.6%
c) Professional recognition achieved	64.1%	28.2%	7.7%
d) Teamwork	76.9%	20.5%	2.6%
e) Possibility of coordinating a work team.	79.5%	17.9%	2.6%
f) Possibility of responding to work problems.	79.5%	17.9%	2.6%
g) The content of your work.	71.8%	23.1%	5.1%
f) Work environment	79.5%	15.4%	5.1%
g) Salary (income and benefits)	53.8%	38.5%	7.7%
h) Actual position	61.5%	35.9%	2.6%

Figure 13 Work satisfaction

III) Aspects of the Industrial Maintenance Engineering career

In this area, the most important aspects of the graduate's perception of their career are considered and likewise it seeks to detect areas of opportunity in order to be improved.

a. His career was his first choice

In the degree in Industrial Maintenance Engineering, 86% of the graduates surveyed from the UTNA was their first choice while 14% was not their first choice at our university.

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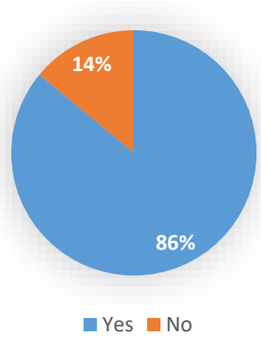

Figure 14 Career Option

b. Reason for choosing the UTNA

The highest percentage in which our students choose to study at the Universidad Tecnológica del Norte de Aguascalientes is for the career with 33%. It is followed by the location with 25% and with 14% each the cost of fees, family council and academic model.

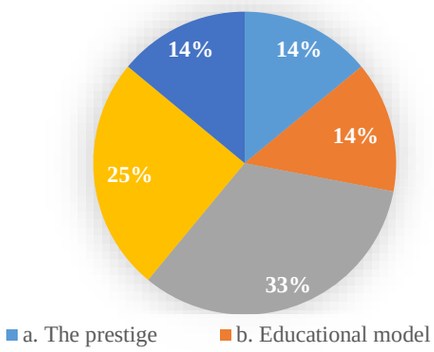

Figure 15 Reason for choosing the UTNA

c. His financial life improved after graduating from college

84% of our students affirm that their life improved after graduating from the degree, however 14% affirmed that it remained the same.

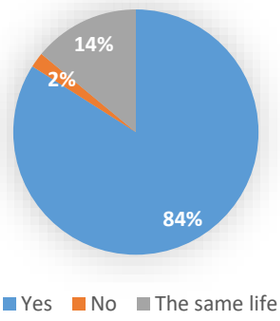

Figure 16 Improves after having studied at UTNA

d. When did you get a job after graduation?

48% of our graduated students affirm that they already had a job before graduating. 40% affirm that they found a job in less than 6 months after graduating, while 9% took more than a year to find a job and 3% took more than six months to find a job.

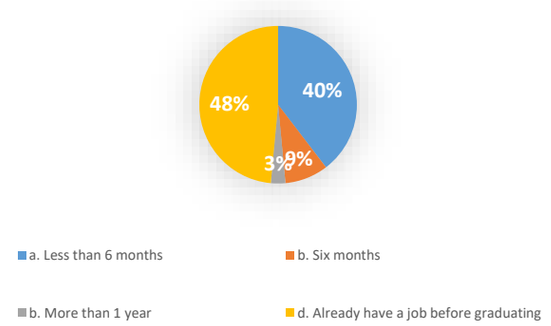

Figure 17 Time to get a job after graduation

e. Does the IME career enable you to identify, formulate and solve problems?

In 100% the students consider that the career allows them to identify, formulate and solve problems.

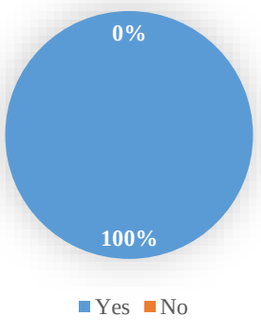

Figure 18 IMI career allows you to identify, formulate and solve problems

f. Do you consider that you have applied, analyzed and synthesized Industrial Maintenance Engineering strategies through human, technological, economic and financial factors?

81 % of the graduates consider that they have applied, analyzed and synthesized Industrial Maintenance Engineering strategies through human, technological, economic and financial factors.

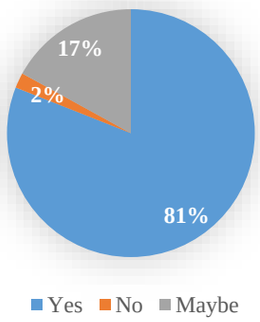

Figure 19 IME strategies

g. Do you consider that the UTNA gave you the necessary elements to communicate effectively in the development of your work?

61% of those surveyed consider that the UTNA gave them the necessary elements to communicate effectively in the development of their work, however 39% consider that perhaps it gave them the elements.

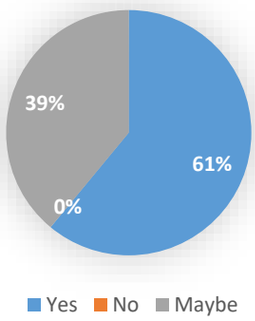

Figure 20 Communication Competence

h. Do you consider that the training that the UTNA gave you today helps you to act with values, proactive, personal, social and environmental attitudes?

78% of those surveyed consider that the training given by the UTNA currently helps them to act with values, proactive, personal, social and environmentally friendly attitudes, while 19% consider that perhaps.

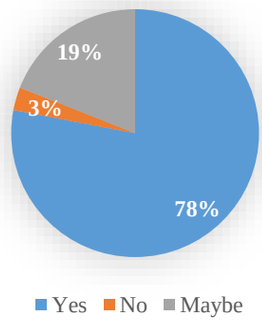

Figure 21 Values and attitudes

i. The graduates responded to what degree the following subjects contributed to the development of their work

Subject	Enough	Regular	Little
a. Chemistry	7.7%	43.6%	48.7%
b. Electricity and magnetism	64.1%	28.2%	7.7%
c. Quality in maintenance	79.5%	15.4%	5.1%
d. Machines and mechanisms	69.2%	28.2%	2.6%
e. Electronic analogue	61.5%	30.8%	7.7%
f. Structure and property of materials	51.3%	30.8%	17.9%
g. Máquinas eléctricas	69.2%	28.2%	2.6%
h. Industrial service networks	51.3%	38.5%	10.3%
i. Thermal machines	69.2%	28.2%	2.6%
j. Tribology	43.6%	46.2	10.2%
k. TPM and RCM techniques	71.8%	23.1%	5.1%
l. Predictive Maintenance	76.9%	17.9%	5.1%
m. Automated systems and industrial networks	59.0%	30.8%	10.2%
n. Strategic management for maintenance	66.7%	25.6%	7.7%
o. English	61.5%	25.6%	12.8%

Figure 22 List of subjects and their contribution to the development of your work

j. Graduates answered in what percentage they carry out the following competencies for their professional development acquired in the UTNA

Entry	Percentage
Design maintenance strategies	33.3%
Optimize maintenance activities	27.3%
Optimize equipment operating conditions	18.2%
Validate engineering studies and technical projects	21.2%

Figure 23 Competences for your professional development acquired at the UTNA

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k. When asking graduates which courses they recommend should be taught in the educational program, they mentioned:

- More about CNC programming and electricity
- Pretty Digital and Analog Electronics
- PLC programming
- Administrative maintenance
- Total productive maintenance TPM and Automation
- Electronics and hydraulics and pneumatics subjects
- More training in design programs such as solidworks, autocad, etc.
- Advanced Excel
- Maintenance administration
- English
- Leadership, personal and professional development and refrigerants.
- Current methodologies

Conclusions

Carrying out a Study of Graduates of our University allows us to have a broader panorama of the current needs of the market, the real possibilities of where our graduates are working as well as having identified the areas of opportunity to improve our study plan according to the needs real of our graduates.

According to the research carried out, the following points can be highlighted:

During the survey, the students reported that 94% were working.

The item that stands out in the monthly income is $ 10,001 to $ 15,000 with a percentage of 36%, while there is also a percentage of 14% that mentions earning more than $ 20,000. Likewise, you have a 22% gain from $ 15,001 to $ 20,000.

The area in which most of our graduates work is as Maintenance Technician, this is 50%, while 28% are working as Maintenance Administrators, and 19% are working as Maintenance Supervisor and only one 3% have achieved a management.

50% of our graduated students affirm that they already had a job before graduating. 40% affirm that they found a job in less than 6 months after graduating, while 9% took more than a year to find a job and 3% took more than six months to find a job.

Likewise, 81% of the graduates consider that they have applied, analyzed and synthesized Industrial Maintenance Engineering strategies through human, technological, economic and financial factors.

61% of those surveyed consider that the UTNA gave them the necessary elements to communicate effectively in the development of their work, however, 38.9% consider that perhaps it gave them the elements.

78% of those surveyed consider that the training given by the UTNA currently helps them to act with values, proactive, personal, social and environmentally friendly attitudes, while 19% consider that perhaps.

In general, a positive aspect can be seen in the development of our graduates on the Industrial Maintenance Engineering career, since most of them have work, a job that gives them to cover their expenses and they continue to develop, likewise most of our Graduates consider that the UTNA gave them the necessary elements to be able to function in the workplace.

Acknowledgment

The support of the authorities of this University is appreciated, especially to Mtra. Erika Magalí Lazcano Ugalde, Director of the Engineering area for her support during this investigation.

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Surname (IN UPPERCASE), Name 1st Author†*, Surname (IN UPPERCASE), Name 1st Coauthor, Surname (IN UPPERCASE), Name 2nd Coauthor and Surname (IN UPPERCASE), Name 3rd Coauthor

Institutional Affiliation of Author including Dependency (No.10 Times New Roman and Italic)

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Abstract (In English, 150-200 words)

Objectives
Methodology
Contribution

Abstract (In Spanish, 150-200 words)

Objectives
Methodology
Contribution

Keywords (In English)

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Keywords (In Spanish)

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* Correspondence to Author (example@example.org)
† Researcher contributing as first author.

Introduction

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General explanation of the subject and explain why it is important.

What is your added value with respect to other techniques?

Clearly focus each of its features

Clearly explain the problem to be solved and the central hypothesis.

Explanation of sections Article.

Development of headings and subheadings of the article with subsequent numbers

[Title No.12 in Times New Roman, single spaced and Bold]

Products in development No.12 Times New Roman, single spaced.

Including graphs, figures and tables-Editable

In the article content any graphic, table and figure should be editable formats that can change size, type and number of letter, for the purposes of edition, these must be high quality, not pixelated and should be noticeable even reducing image scale.

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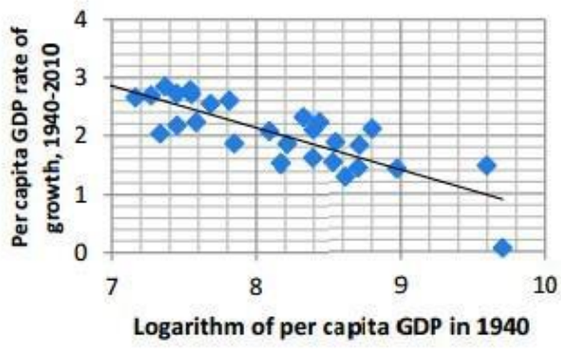

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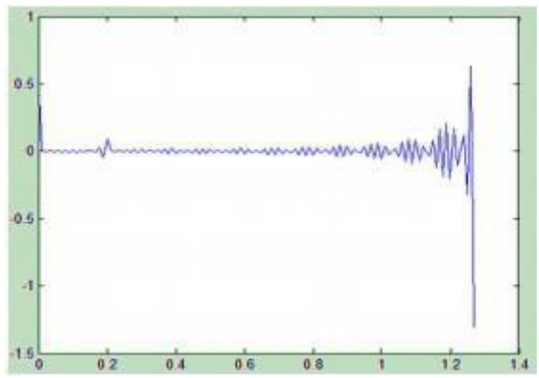

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	Mean square	df	Mean square	df		
SOLVENCY	77.287	4	.426	532	181.247	.000
LIQUIDITY	77.182	4	.427	532	180.669	.000
SIZE	62.602	4	.537	532	116.616	.000
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Table 1 Title and Source (in italics**).**

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For the use of equations, noted as follows:

$$Y_{ij} = \alpha + \sum_{h=1}^{r} \beta_h X_{hij} + u_j + e_{ij} \quad (1)$$

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Methodology

Develop give the meaning of the variables in linear writing and important is the comparison of the used criteria.

Results

The results shall be by section of the Article.

Annexes

Tables and adequate sources

Thanks

Indicate if they were financed by any institution, University or company.

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2524 2075
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