

Determination of the degree of burnout syndrome in engineering student-workers of the UTCH

Determinación del grado del síndrome de burnout en estudiantes-trabajadores de ingeniería de la UTCH

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Resumen

El presente artículo tiene el objetivo de identificar el grado de síndrome de burnout en estudiantes de ingeniería, pertenecientes al turno nocturno, que trabajan por la mañana en una jornada de tiempo completo, con la finalidad de obtener datos precisos para mejorar el plan de acción tutorial de la UTCH. El estudio parte de la hipótesis de que los estudiantes de ingeniería del turno nocturno, que laboran, tienen un alto grado de agotamiento emocional, despersonalización y dificultad para la realización personal (Burnout). Para ello se aplicaron 175 Test «Maslach Burnout Inventory» (MBI), que se analizaron mediante la categorización por sumatoria de clases para determinar el grado de desgaste de los estudiantes. Se validan las categorías con el Alfa de Cronbach de manera individual, resultando por encima del 70%. Se analizan los ítems de manera individual y agrupada según su categoría y su dispersión respecto a la normalidad. Los resultados muestran un alto grado de burnout, en los estudiantes que compaginan la vida laboral y los estudios. Al encontrar veracidad en el estudio se generan aportaciones significativas para la mejora de las estrategias del Programa de Acción Tutorial y así atender las necesidades socioemocionales de los estudiantes.

Burnout, estudiantes-trabajadores, tutoría

Abstract

The aim of the following article is to identify the degree of burnout syndrome in engineering students from the evening shift, who work full time in the morning. The objective is to obtain accurate data to improve the tutorial action plan from UTCH. The research starts from the hypothesis that engineer students from the evening shift, who work, experience a high degree of emotional exhaustion, depersonalization and difficulty in personal fulfillment (Burnout). To achieve this, 175 Test «Maslach Burnout Inventory» (MBI), were administered and analyzed using the categorization by summation of classes to determine the level of burnout among students. The categories are validated individually using Cronbach Alfa, resulting in scores above 70%. The items are analyzed individually and in groups according to their category and dispersion in respect to normality. Finding validity in the research generates significant contributions to improve the strategies of the Tutorial Action Program and therefore address the socioemotional necessities of the students.

Burnout, students-workers, mentoring

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1. Introducción

Within the Mexican higher education system, teaching and mentoring are the main functions of a full-time professor. Mentoring is defined by the national Association of Universities and Higher Education Institutions (ANUIES) as a process of accompanying students during their education, which is achieved through personalized attention provided by competent and trained academics to individual or small groups of students (ANUIES, 2000).

On the other hand, the former General Coordination of Technological and Polytechnic Universities (CGUTyP) states that “tutorial action is the process of personalized accompanying provided by teachers and specialists during students’ education, implementing strategies for identification, guidance, channeling and monitoring in the academic, socioeconomic, and personal domains” (CGUTyP, 2017, p.9). Therefore, there is no doubt that tutorial action plays a clear formative role, supporting the prevention and correction of difficulties that students encounter throughout their education.

The Technological University of Chihuahua (UTCH), as part of the subsystem of the Directorate of Technological and Polytechnic Universities (DGUTyP), has an Institutional Tutoring program (PIT) that define the general functions of a tutor. Based on the PIT, tutors develop their Tutorial Action Plan (PAT), which consists of a series of sequenced activities aimed at providing academic and personal guidance to their mentored students, with the objective of contributing to the reduction of institutional dropout and failure rates.

It is important to point out that the function of detection is relevant, since through the collected data, the strategies of the PAT can be improved, and students can be guided more promptly in overcoming obstacles that hinder their satisfactory performance in both academic and personal areas.

Therefore, the objective of this study is to identify the level of burnout syndrome among engineering students who belong to the night shift and work in the morning in a full-time job in order to improve the tutorial action plan of UTCH.

In recent years, tutors have observed that students experience high levels of stress and anxiety. Similarly, the same data is observed in the reports from the psychology department, as shown in Table 1.

| Reason of consultation | Number of cases attended in 2021 | Number of cases attended in 2022 |
|------------------------------------|----------------------------------|----------------------------------|
| | Total | Total |
| Anxiety | 198 | 286 |
| Self-esteem | 66 | 97 |
| Stress | 10 | 92 |
| Depression | 55 | 86 |
| Emotion management (anger control) | 17 | 26 |

Table 1 Reasons for consultation in the Psychology Department

Source: own elaboration with data from PROYECTA

It is observed that there is a 45% increase in anxiety issues in the year 2022 compared to 2021. And at the end of the first quarter of 2023, there have been 131 cases attended to for anxiety, representing 45% of the total cases reported in 2022, which demonstrates that emotional health problems are on the rise in the institution.

Based on the aforementioned, it is essential to look for new strategies to battle the level of stress that leads to academic underperformance among students throughout their education due to emotional exhaustion.

For educational organizations, it happens to be a challenging task to maintain the students’ performance at optimal levels and keep the rates of failure and dropout low. This is because their psychological well-being is compromised due to constant workload, lack of rest time, family issues, social pressures, among others.

In higher education, it is very common to find young students who study and work simultaneously. They do so either to cover their educational expenses, contribute to family finances, seek economic independence, and fulfill needs that cannot be provided within the family unit due to limited monetary income. However, this situation is especially prevalent among students who are heads of households or responsible for their families.

For them work becomes a priority as they must partially or entirely provide for their household, and pursuing a professional career becomes an opportunity to improve their job prospects and financial situation.

When a student works for an organization, he fulfills his duties in order to be compensated with a salary. At the university, he also fulfills a role, he carries out tasks that require effort, he has to fulfill objectives and his performance must be evaluated (Riveros et al., 2018). Both activities in his life can trigger stress reactions, as is the case with the profile of students in UTCH majors, particularly those in the evening shift of Industrial Engineering, Mechatronics and Maintenance, who combine their work life with their studies.

Selye (1960, cited by Lovo, 2020, p. 111) defines stress as the “sum of physiological responses, mainly hormonal, induced as a reaction to stressors. It is the activation of the hypothalamic-pituitary-adrenal axis, which leads to an increase in the production of corticosteroids and the subsequent activation of the sympathetic-adrenal-medullary axis. The activation of these adaptive responses in the body and the psychological mechanisms of compensation that the body performs to prevent these responses from altering the balance, if sustained for a long time, can cause significant damage.

The general adaptation syndrome goes through three stages according to Duval et al. (2010): 1) Alert stage; the hypothalamus stimulates the adrenal gland to secrete adrenaline as the body’s response (increased heart rate, vasodilation, heightened alertness). 2) Resistance stage; it is activated if the stimulus persists, cortisol is secreted to maintain sufficient glucose in the blood to nourish the muscles, heart, and brain, allowing the individual to “resist”. 3) Exhaustion or relaxation stage; appears if the situation continues, leading to chronic hormonal disruption with organic and psychiatric consequences. As this stage persists, the secreted hormones become less effective and begin to accumulate in the circulation, negatively impacting health.

Since the 1960s, and over the following years, the term Burnout Syndrome has been studied, as a chronic adaptive disorder associated with the inadequate coping mechanism of the psychological demands in the workplace which affects people’s quality of life (Gutierrez Aceves et al., 2006, cited in Lovo 2020).

Maslach and Jackson (1981) describe the syndrome as emotional exhaustion and depersonalization that frequently occurs in individuals who engage in some form of “people work”. It generates feelings of reduced emotional resources (emotional exhaustion), negative attitudes and emotions towards their clients (depersonalization), and a tendency to evaluate oneself negatively regarding their own work (difficulty in achievement or decreased personal performance). Workers feel unhappy with themselves and dissatisfied with their accomplishments at work. When we say that a professional is “burned out” it is because a situation (work-related, family-related and social) has overwhelmed them, depleting their capacity to react adaptively (Lovo, 2020).

Based on this definition and its components, the “Maslach Burnout Inventory” (MBI) was developed in 1981, with the aim of measuring personal Burnout in human services areas. This scale has become the most widely accepted and has undergone three revisions. In the latest revision, professions that are “non-assistance” in nature, meaning those that do not necessarily involve direct interaction with people, such as manual or administrative occupations have been included (Martínez Pérez, 2010).

As shown in Table 2, The Maslach Burnout Inventory considers emotional exhaustion as the feeling of weariness, physical overexertion, exhaustion, and fatigue that results from continuous contact with people who need care in conditions that are not well suited for the worker.

The cold and depersonalized attitude (depersonalization) is evident through negative, distant, ironic, and cold feelings, attitudes, and responses towards others (insensitivity), especially towards clients and users.

Typically, this attitude is often accompanied by irritability, loss of motivation towards work, and reactions of distance, cynicism, and hostility, both towards beneficiaries and colleagues. The low achievement or reduced professional or personal performance is characterized by a tendency to evaluate oneself negatively as a result of the feeling of inefficacy and lack of achievements. This translates into low work performance, an inability to handle pressure, and low self-esteem, which ultimately affects personal and professional relationships (Ministry of Labor, 2015; Quinceno & Vinaccia, 2007)

| Components | Emotional exhaustion | Cold attitude and depersonalized | Low professional or personal fulfillment |
|------------------------|---|--|---|
| Characteristics | Sensation of weariness. Physical overexertion. Exhaustion. Fatigue. | Feelings, attitudes and negative responses. Irony. Irritability and loss of motivation towards work. Social distancing reactions. Cynicism. Hostility. | Low work performance. Inability to handle pressure. Low self-esteem. Impact on professional and personal relationships. |

Table 2 Components of Burnout Syndrome

Source: Own Elaboration using data from the Ministry labor (2015)

There are several manifestations of the syndrome that have been considered as symptoms or warning signs: denial, anxiety, fear (of going to work), depression, anger, escape, addictions, personality changes, guilt, accepting excessive workloads, risky or impulsive behavior (not characteristic of the person), disillusionment, self-abandonment, memory loss, and disorganization (Gutiérrez Aceves, 2006).

According to Gutiérrez Aceves (2006, pp. 307 – 308), a clinical picture of four stages is observed for this syndrome.

Stage 1. A perceived imbalance between work demands and material and human resources with the former exceeding the latter, leading to a situation of acute stress.

Stage 2. The individual makes an extra effort to adapt to the demands. However, this only works temporarily (uo to this point, the condition is reversible).

Stage 3. The burnout syndrome appears with the described components.

Stage 4. The psychologically and physically damaged individual becomes a danger rather than a help to the recipients of the services.

The burnout syndrome has been studied in basically all professions. The percentage of individuals identified as having the classical symptomatology depends on the type of profession, the demands performed on the job, the workers' perception of their own personal fulfillment, among other influential variables (Lovo, 2020).

2. Methodology

Objective

Identifying the degree of burnout syndrome in engineering students belonging to the night shift, who work in a full-time morning job, in order to improve the tutorial action plan at UTCH.

Hypothesis

Engineering students from the night shift who work have a high degree of emotional exhaustion, depersonalization and difficulty for personal fulfillment (Burnout).

Sample

According to the enrollment for September-December 2022, there were a total of 481 students in the Industrial Engineering, Industrial Maintenance Engineering, and Mechatronics Engineering programs. Therefore, for a confidence level of 90% with a 5% margin of error, a sample of 175 students is calculated. The participating students meet the following characteristics:

- a. They have financially dependent individuals.
- b. They study engineering in the night shift.
- c. They belong to the Technological University of Chihuahua.

- d. They are enrolled in the Industrial Engineering, Industrial Maintenance Engineering, and Mechatronics Engineering programs.
- e. They have a full-time work schedule in their job context.

Instrument

For research purposes, the «Maslach Burnout Inventory» (MBI) test is used. The questionnaire consists of 22 items, which are classified into three scales called Emotional Exhaustion (E.E), Depersonalization (D), and Personal Fulfillment (P.F.). In the study, the information is grouped according to the frequency in each response. The possible responses belong to Likert type scale in which they indicate the frequency with which they have experienced the situation described in the item. This sequency scale has 7 levels which ranging from 0 (Never) to 6 (Everyday).

Table 3 shows the possible answers for the questionnaire according to the Likert scale.

| Value | Answers |
|-------|-----------------------------|
| 0 | Never. |
| 1 | A few times a year or less. |
| 2 | Once a month or less. |
| 3 | A few times a month. |
| 4 | Once a week. |
| 5 | A few times a week. |
| 6 | Everyday. |

Table 3 Answers of the Likert Scale
Source: Own Elaboration

In Annex 1, the questionnaire items are classified, along with the scale to which each of them belongs.

Table 4 shows the levels (Low, Medium and High) in which the sums of results for the items of each scale are grouped to determine the degree of psychoemotional distress.

| | Low | Medium | High |
|----------------------|--------|---------|---------|
| Emotional exhaustion | 0 – 18 | 19 – 26 | 27 – 54 |
| Depersonalization | 0 – 5 | 6 – 9 | 10 – 30 |
| Personal Fulfillment | 0 – 33 | 34 – 39 | 40 – 56 |

Table 4 Grades of the MBI Scales for interpretation
Source: Own Elaboration

Data collection and analysis

For the data collection process, the instrument is applied to students who belong to the night shift of Industrial Engineering, Industrial Maintenance Engineering, and Mechatronics Engineering of the Technological University of Chihuahua, during the period from January to April 2023 and who currently work actively in the industry. The data collection process is carried out by the support of Industrial Engineering students, who administered the questionnaires in their workplace context.

For data analysis, categorization is performed by summing the scores to determine the overall level of burnout among students, in a way that allows establishing a parameter that enables making decisions for the improvements of the Tutorial Action Plan (PAT) at the institutional level.

Instrument Validation

To validate the instrument a pilot test is conducted at the beginning of the January-April 2023 period. The pilot test is administered to 27 students from the Industrial Engineering program as a part of the Planning and Organization of Work course. The results show answers close to the average and a similar pattern of answers, which implies that the data variability does not create conflict for drawing inferences. Based on this pilot application, 117 more questionnaires are administered from the other involved programs within the workplace program.

Data Validation

To validate the data, the analysis is conducted using the statistical package SPSS. Table 5 presents the results of the measurement by category, where the Cronbach's Alpha is analyzed individually. According to the results, the data is validated since the Cronbach's Alpha values are considered acceptable, being above 70%. Additionally, individual factors associated with variable (items) are analyzed, with an acceptable maximum error of 5%. This determines that the average variability is 1.52, which includes the range of answers in three possibilities.

| Category | Items | Cronbach |
|----------------------|-------|----------|
| Emotional exhaustion | 9 | 87% |
| Depersonalization | 5 | 81% |
| Personal fulfillment | 8 | 76% |

Table 5 Data Validation through Cronbach's Alpha
Source: Own Elaboration

3. Results

For the analysis of results, the items must be studied individually and grouped according their category (EE, D and PF) and their dispersion with respect to normality. According to similar studies, normality is associated with the occasional manifestation of the evaluated criteria, sometimes a year for those associated with emotional exhaustion and depersonalization, and at least once a month for those related with personal fulfillment.

In figure 1, you can observe the peaks of the normality trends (circles) tending towards the extremes and the results opposing the contrary response according to normality. The items with the greatest amplitude with respect to normality correspond to:

- Emotional exhaustion from work (item 1).
- Fatigue at the end of the workday (item 2).
- Fatigue at the beginning of the workday (item 3).
- Wear and burden (item 8).

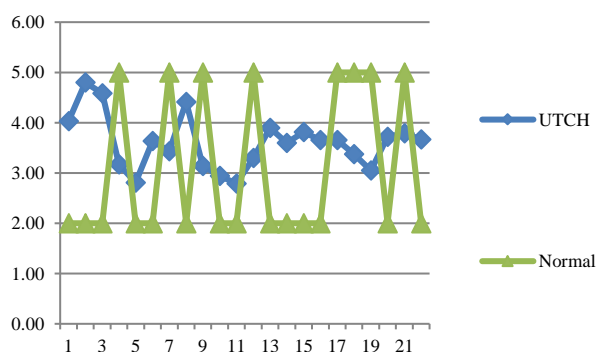


Figure 1 Comparison of results and normality in these items

Source: Own Elaboration

After analyzing the data, a trend towards the extreme of answers can be observed, indicating effects of emotional exhaustion and depersonalization.

According to the results, each participant shows manifestations of burden at different time frequencies, with a bias towards frequencies per week for the items related to Emotional Exhaustion (E.E) and Depersonalization (D).

Items 1, 2, 3, and 8 represent the highest differences commonly associated with Emotional Exhaustion. Table 7 shows the results of the average values and a normality parameter for comparison and measurement. According to the amplitude of the comparative difference, the deviation is classified into the following parameters:

- Low [From 0 a .5]
- Medium [From .51 a .1]
- High [From 1.01 a 1.99]
- Very high [From 2 a 3]

As can be seen in Table 6, the answers associated with weekly occurrence are the ones that appear with the highest frequency.

| | UTCH | Normal | Difference | Deviation | Adjustment | Answer |
|----|------|--------|------------|-----------|------------|----------------------|
| 1 | 4.03 | 2 | 2.03 | Very high | 4 | Once a week. |
| 2 | 4.80 | 2 | 2.80 | Very high | 5 | A few times a week. |
| 3 | 4.58 | 2 | 2.58 | Very high | 5 | A few times a week. |
| 4 | 3.17 | 5 | 1.83 | High | 3 | A few times a month. |
| 5 | 2.81 | 2 | 0.81 | Median | 3 | A few times a month. |
| 6 | 3.63 | 2 | 1.63 | High | 4 | Once a week. |
| 7 | 3.43 | 5 | 1.57 | High | 3 | A few times a month. |
| 8 | 4.41 | 2 | 2.41 | Very high | 4 | Once a week. |
| 9 | 3.14 | 5 | 1.86 | Alta | 3 | A few times a month. |
| 10 | 2.94 | 2 | 0.94 | Median | 3 | A few times a month. |
| 11 | 2.79 | 2 | 0.79 | Median | 3 | A few times a month. |
| 12 | 3.30 | 5 | 1.70 | High | 3 | A few times a month. |
| 13 | 3.90 | 2 | 1.90 | High | 4 | Once a week. |
| 14 | 3.60 | 2 | 1.60 | High | 4 | Once a week. |
| 15 | 3.82 | 2 | 1.82 | High | 4 | Once a week. |
| 16 | 3.66 | 2 | 1.66 | High | 4 | Once a week. |
| 17 | 3.66 | 5 | 1.34 | High | 4 | Once a week. |
| 18 | 3.38 | 5 | 1.62 | High | 3 | A few times a month. |
| 19 | 3.05 | 5 | 1.95 | High | 3 | A few times a month. |
| 20 | 3.72 | 2 | 1.72 | High | 4 | Once a week. |
| 21 | 3.79 | 5 | 1.21 | High | 4 | Once a week. |
| 22 | 3.67 | 2 | 1.67 | High | 4 | Once a week. |

Table 6 Summary of results and adjustment.

Source: Own Elaboration

When summarizing the results by category, Table 7 shows that both Emotional Exhaustion and Depersonalization are at a high level, which indicates that the students-workers exhibit a high degree of Burnout, mainly in Emotional Exhaustion and Depersonalization.

| | Low | Medium | High | Result |
|----------------------|--------|---------|---------|--------|
| Emotional Exhaustion | 0 – 18 | 19 – 26 | 27 – 54 | 34.01 |
| Depersonalization | 0 – 5 | 6 – 9 | 10 – 30 | 16.53 |
| Personal fulfillment | 0 – 33 | 34 – 39 | 40 – 56 | 28.74 |

Table 8 Summary of results by category.
Fuente: elaboración propia.

4. Annexes

Annex 1 Items of the MBI questionnaire

| | Items | Scale |
|----|--|-------|
| 1 | I feel emotionally exhausted because of my work. | E.E. |
| 2 | I feel tired at the end of the workday. | E.E. |
| 3 | When I wake up in the morning and face another workday I feel fatigued. | E.E. |
| 4 | I have the ability to understand how my coworkers feel. | P.F. |
| 5 | I think, I am treating some coworkers as if they were impersonal objects. | D |
| 6 | I feel, that working all day with other people requires a lot of effort and it exhausts me. | E.E. |
| 7 | I believe, I handle my coworkers' problems very effectively. | P.F. |
| 8 | I feel that my work is wearing me down. I feel overwhelmed by my job. | E.E. |
| 9 | I believe that with my work, I am influencing positively my coworkers' lives. | P.F. |
| 10 | I have become more insensitive with people since I work in something related to my profession. | D |
| 11 | I think this job is emotionally toughening me. | D |
| 12 | I feel with much energy at my job. | P.F. |
| 13 | I feel frustrated at my job. | E.E. |
| 14 | I believe, I work too much. | E.E. |
| 15 | I am not really concerned about what happens to my coworkers. | D |
| 16 | Working directly with coworkers stresses me out. | E.E. |
| 17 | I feel, that I can easily create a pleasant atmosphere with my coworkers. | P.F. |
| 18 | I feel motivated after working in contact with my coworkers. | P.F. |
| 19 | I believe, I get many valuable things in this job. | P.F. |
| 20 | I feel burn out at my job, at the limit of my abilities. | E.E. |
| 21 | At my job, I deal problems emotionally with a lot of calmness. | P.F. |
| 22 | I believe my coworkers blame me for some of their problems. | D |

Nomenclature: **E.E.** Emotional Exhaustion, **D** Depersonalization, **P.F.** Personal Fulfillment.

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Conclusions

The study concludes that the degree of burnout is high, mainly in emotional exhaustion and depersonalization, among students who balance work and studies, which may lead to a low level of academic performance. Therefore, the hypothesis in this study is accurate. The results should impact the improvement of the strategies used in the Tutorial Action Plan (PAT) to address the emotional management needs of students.

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