WELCOME INTRODUCTION

Dear ICERI2013 participants,

It is a pleasure to welcome you all to the 6th International Conference of Education, Research and Innovation.

Thank you for coming to this inspiring forum of knowledge exchange. Some of you have travelled very far to attend this conference. In fact, ICERI2013 has brought together nearly 700 delegates from over 75 countries.

ICERI2013 aims to be a dynamic conference where you will benefit from the great variety of topics and presentations. The program will offer parallel sessions covering all aspects of learning, teaching and educational technology. You will be exposed to many diverse projects and experiences in a multidisciplinary and truly international atmosphere. Also, the social events will promote the interaction with other colleagues with the same aim as you: learning from others and sharing their best practices and experiences.

Finally, you should take some time to discover the attractive city of Seville and its mixture of cultures. The colors, sounds, emotions, feelings, smiles and aromas in Seville will captivate your senses.

Thank you again for attending ICERI2013. We wish you a fruitful and unforgettable conference.

ICERI2013 Organising Committee
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IMPLEMENTATION OF THE METHOD OF LINEAR REGRESSION FOR THE MODELING OF THE RELATIONSHIP BURNOUT - TEACHING PERFORMANCE

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Abstract
Currently, investigations that looks for the variables that influence poor academic performance, high dropout rates, low completion rate and teacher performance are becoming more rational and meaningful. In this paper is shown, as a second phase of research to predict, with a high percentage of accuracy, the academic performance of the candidates to study a university career, a study that discovers other coefficients in a lot of the analyzed variables: teacher performance and the burnout syndrome.

The Burnout Syndrome describes physical and psychological states of the individual, characterized by decreased energy, focus and motivation, among others. This symptom is a major cause of absence from work and, in some cases, school dropout. It has also been considered as a variable that could cause poor teaching performance or poor academic accomplishment [1].

The Burnout affects people who work with and for other people, for example teachers, students, doctors, nurses, psychologists, etc., no age or gender discrimination. Teachers and college students are constantly under situations that may cause the syndrome to manifest itself.

Holding the hypothesis that burnout syndrome affects academic performance among the university professors by influencing teacher performance, in this investigation was determined, by the mathematical method of linear regression, the relationship between teachers burnout syndrome in the School of Computer Science in Mazatlan City (FIMAZ) of the Autonomous University of Sinaloa (UAS) and teacher performance, the result obtained on the assessment made by professors on the administration of the institutional administration and quantified as the percentage given by the students on various items such as class planning, content delivery, time management, assessment, etc.. Information was collected using a specialized instrument to measure the presence of burnout syndrome (Maslash Scale) between teachers.

Among the most relevant results stands out that teachers with a seniority of 15 years or more, have better rates of teacher performance (85% or more) and low levels of exhaustion (burnout), while teachers with 14 years of teaching experience, obtained an approval of students less than 85% and high levels of exhaustion (burnout).

It is important to note that, overall, 20% of the teachers surveyed presented high rates of burnout and 36% average levels of the syndrome. It can be concluded that the burnout syndrome impacts on younger teachers with less seniority, thus affecting their teaching performance. But shouldn’t be excluded other factors also involved in teaching and learning, such as knowledge of the discipline, dedication, personal and social situations.

Keywords: Burnout Syndrome, Lineal Regression, Teacher Performance, Academic Performance.

1 INTRODUCTION
The stress of daily lives in today’s society is caused by multiple situations. Globally, the bulk of the workforce is always under tension or likely to suffer it. The daily work requirements cause some sort of physical or psychological exhaustion. Activities which involve the interaction with other people such as medicine, nursing, psychology or teaching foster among its professionals a syndrome called burnout syndrome.
In Europe, one in four people suffer from stress and between 50% and 60% of work absences are caused by this disease [2].

Burnout syndrome is considered an additional variable influencing teacher performance, as does the low pay, lack of participation in decisions of the institution, pressure to perform research and publications among others [3]. Therefore, it is an important factor in predicting academic performance as noted, this work is part of a larger research that seeks to predict the academic performance of college students, before starting their studies.

The term burnout is an anglicism, at first used by British society as a popular concept within the sports jargon describing a situation in which, contrary to the person’s expectations, he or she could not get the expected results however the preparation and effort made to achieve it. [4]

In Spanish, the literal translation is to be burned, but it can also be translated as the professional burnout syndrome or professional burning [5]. In French the term is translated syndrome d'épuisement professional and literal translation in Spanish will be, síndrome de agotamiento profesional, or síndrome de desgaste profesional.

This term was first used by Herbert Freudenberger in 1974, where he observes the cynicism and lack of interest from professional burnout syndrome towards his patients. Freudenberger found that these symptoms were equally manifested in any healthcare professional and described in Article Staff Burnout [6]. The pioneer in writing on this topic was Herbert Freudenberger, an American psychiatrist who repeatedly observed some deterioration in the carrying out of the assisntential activities of some of his colleagues, even the most brilliant and dedicated [7].

The burnout syndrome is characterized by various symptoms such as ... progressive deteriora-tion and exhaustion coupled with a drastic reduction in energy ... often accompanied by a loss of motivation (...) that over time affects the attitudes, manners and general behavior [8].

The university professor, before the many tasks that occupy or are assigned to him, besides teaching, like management, relationship, research, mentoring, counseling, etc., is faced with a large load of work and with limited time to carry it out, resulting in a high percentage of professional burnout syndrome. This worn out does not affect all teachers equally, there are particular characteristics of teachers that makes some people more likely than others to experience the burnout syndrome. The salary, for example, is one of these characteristics. And the direct and visible consequence of burnout is the loss of quality in their work, mainly in the classes they teach.

The capacity to quantify the level of exhaustion in teachers is useful to determine, at what point should decrease their workload or commission the teacher to other duties until their exhaustion level decreases.

In the Facultad de Informática Mazatlán, Universidad Autónoma de Sinaloa, Mexico, headquarters of secondment of teachers subject of this research, teachers are divided into two categories, those with a limited amount of hours an those with full-time activities. The full-time professors are those who are required to perform extra work to work in the classroom, those in the other category carry out that work to merit full-time status.

For this research suggests that teachers with a high level of Professional Burnout Syndrome have poor teaching performance.

1.1 Teachers' Performance

In Mexico, university teachers are advised or encouraged to participate in government programs promoted by the Ministry of Education, with which they earn scholarships, incentives or other financial remuneration. To win these awards it is necessary that the teacher performs multiple activities besides teaching. Schemes such as the Faculty Improvement Program (PROMEP) or the National System of Researchers (SNI), for admission require that teachers in higher institutions do research, management, mentoring, counseling, conduct projects, direct theses, and so on. Besides, state governments convene for that kind of programs, but what appear to be support for the teachers - researchers can also be seen as a self-increasing workload to get these benefits, since in many cases teachers are not well paid.

Also, in many public and private universities teachers are evaluated in order to determine their performance. In the particular case of the Autonomous University of Sinaloa, students evaluate
teachers in eight areas: Planning Process for Learning, Use of Time, Contents Management, Facilitation of Interactions, Use of Technologies for Information and Communication, Learning Assessment, Satisfaction with Teaching Performance.

So teachers must fulfill their responsibility to teach, along with activities that include various government programs and together with the obligation to be evaluated. All this is stressful from any point of view and certainly hinders the goal of reaching a one hundred percent in the realization of their work, being the largest concern the impoverishment in human resource training.

1.1.1 Maslash Burnout Inventory

The Maslach Burnout Inventory (MBI) is a tool to determine the level of Professional Burnout Syndrome of a person working with or for others. It consists of an instrument (survey), where the interviewee is submitted to statements about their feelings and thoughts in relation to his work. It is the instrument that has produced the greatest amount of research in this field; consists of 22 items of the type summary assessment method, commonly called Likert scale type, where the subject values, with one of six possible qualifiers, how often he perceives each of the situations mentioned in the items.

1.2 Linear Regression

The linear regression analysis is a mathematical method used to study the relationship between variables. The objective of simple linear regression consists in presenting the case where the average value of a variable Y is related to a variable X, that is, with simultaneous observations about Y and X, using information from the measurements of X estimating the average value of Y or Y predict particular values for assigned values of X. This relationship can be represented by a mathematical model that expresses the functional relationship between Y and X, given by $Y = f(X)$.

There are many software programs to perform the linear regression in automatized mode, such as Excel, Matlab, Statistica, Minitab, etcetera. In this study we used the Excel data analyzer to carry out the analysis of the relationship between teacher performance and the burnout syndrome.

2 METHODOLOGY

We used the Maslach Burnout Inventory (MBI) consisting of 22 items to survey and measure the percentage of Professional Burnout Syndrome by three factors: emotional exhaustion, depersonalization and personal accomplishment at work. At these factors have been obtained from 25 teachers of the Faculty of Computer Mazatlan, Autonomous University of Sinaloa and constitute the three subscales of the MBI.

The Emotional Exhaustion subscale or Emotional Exhaustion (EE) organized in nine items about the decrease or loss of emotional resources or describe feelings of being emotionally saturated and tired of work. The depersonalization subscale or depersonalization (D) consists of five items describing a cold and impersonal response and lack of feeling and insensitivity toward students. And the personal accomplishment subscale in the Business or Personal Accomplishment (PA) consists of eight items that explain feelings of competence and work efficiency, together with the tendency to evaluate one's work negatively and the sensation of professional failure.

In the EE and D subscales, the higher percentages correspond to feelings of worn out; in the low PA subscale scores correspond to high feelings of exhaustion. The results are considered as continuous variables, and the scores of the study subjects teachers are rated using a system of percentiles for each scale. It is considered that teachers scoring above the 75th percentile are included in the high category, between 75 and 25 percentile in the average category and below the 25th percentile in the low category.

The cutoff point can also be set using the following criteria. In the EE subscale scores of 27 or higher indicate a high level of burnout, the range between 19 and 26 correspond to intermediate scores, with scores below 19 indicative of low levels of burnout. In D subscale scores above 10 indicate high, 6 to 9 and less than 6 medium low. The PA subscale is inversely proportional to the above. From 0-30 points indicate low personal accomplishment, from 34 to 39 middle, and a high sense of accomplishment in the ones with a score exceeding 40.

In the School of Computer Mazatlan, Autonomous University of Sinaloa work 32 teachers, of whom 25 responded fully to the applied instrument (MBI). Of the 25 teachers who completed the instrument,
there is also other data, including the results in teacher evaluation, gender, age, seniority in the institution, number of years as a teacher, and so on.

Of the 25 teachers of the Faculty of Computer Mazatlan, Autonomous University of Sinaloa, with full results in teacher evaluation, in the teaching evaluation the professors were appraise in eight areas (Planning Process for Learning, Time Management, Content Delivery, Facilitating Interactions, Learning Strategies, Use of Information and Communication Technology, Learning Assessment, Satisfaction with Teaching Performance), and shown in Table 1.

<table>
<thead>
<tr>
<th>Items Evaluated</th>
<th>Escale</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Planning Process for Learning</td>
<td>0-100</td>
</tr>
<tr>
<td>2 Time management</td>
<td>0-100</td>
</tr>
<tr>
<td>3 Content Delivery</td>
<td>0-100</td>
</tr>
<tr>
<td>4 Facilitating Interactions</td>
<td>0-100</td>
</tr>
<tr>
<td>5 Learning Strategies</td>
<td>0-100</td>
</tr>
<tr>
<td>6 Use of Information and Communication Technology</td>
<td>0-100</td>
</tr>
<tr>
<td>7 Learning Assessment</td>
<td>0-100</td>
</tr>
<tr>
<td>8 Satisfaction with Teaching Performance</td>
<td>0-100</td>
</tr>
</tbody>
</table>

In Table 1 can be seen the eight items on which teachers are qualified by students who taught at least one class (a course) for the previous semester. They are evaluated between 0 and 100 in each of the categories. All the data collected with the instrument was concentrated with the professors personal data in combination with the teaching evaluation and were stored in Excel and was completed the regression analysis.

3 RESULTS

Complete data were obtained from 25 teachers out of a total of 32, so data are a percentage over 78%, of which 19 are male and 6 were female, Figure 1.

![Percentage distribution of teachers by gender.](image)

Figure 1 shows the percentage distribution of teachers under study, the 19 men representing 76% and the 6 women the 24% of the remaining teachers.

The data distribution of teachers concerning the three subscales (personal accomplishment, depersonalization, emotional exhaustion) of MBI is shown in Table 2.

<table>
<thead>
<tr>
<th></th>
<th>High</th>
<th>Average</th>
<th>Low</th>
</tr>
</thead>
<tbody>
<tr>
<td>Emotional exhaustion</td>
<td>5</td>
<td>9</td>
<td>11</td>
</tr>
<tr>
<td>Depersonalization</td>
<td>2</td>
<td>11</td>
<td>12</td>
</tr>
<tr>
<td>Personal accomplishment</td>
<td>13</td>
<td>9</td>
<td>3</td>
</tr>
</tbody>
</table>

As shown in Table 2, all teachers have some level of Professional Burnout Syndrome, but only five of them with a high level of emotional exhaustion subscale. In the depersonalization subscale, only two
teachers had a high level. In the Personal Accomplishment subscale, only three teachers showed a low level, 22 teachers say they feel with high or medium personal accomplishment.

The data in Table 2 was transplantated to Figure 2, which shows the distribution and frequency of the data of teachers according to the three subscales of the Maslach Burnout Inventory.

![Figure 2. Distribution and frequency of the data of Table 2.](image)

Teachers were grouped into three categories according to the level of burnout (high, medium, low), adding the data that characterizes them, as age range, gender and average teacher performance evaluation of each age range. In the following three paragraphs the above indicated will be summarize. In Figures 3 and 4 shows a visual representation explained the three paragraphs that follow.

The five teachers with a high level of burnout are in an age range between 28 and 31 years, four men and one woman. The average teacher performance evaluation of the five is 82.2%.

With an average level of burnout were found nine teachers, their age range is between 37 and 57 years, seven are male and two female. All nine have an average teaching evaluation given by 86.8% students.

With a low level of professional burnout are 11 teachers, which are in an age range of between 39 and 58 years, three women and eight men. Overall, the 11 teachers received on average 87.8% in the evaluation of their performance by the students.

![Figure 3. Age range and Gender Frequency.](image)

In Figure 3 stands out that among younger faculty groups the frequency is lower, ie, a greater number of teachers in the range of 39 to 58 years, than in the 37-57 or 28-31. It can also be seen the reality of gender inequality, given the higher percentage of men than women in any age group.
Figure 4. Relationship between the age range of teachers with the level of Professional Burnout Syndrome and teacher performance.

Figure 4 shows the relationship between the age range of teachers with the level of Professional Burnout Syndrome and the pass rate of students as measured by teacher performance. It can be seen that among the younger age group (28-31 years) we found the highest level of exhaustion and lesser grades in evaluating teacher performance. Among the older age range, 37-57 years and 39-58 years we have middle and lower levels of burnout, respectively; as well as a better teacher performance evaluation, 86.8% and 87.8%, respectively.

Figure 5. Burnout-Teacher performance relationship diagram.

In Figure 5 is shown a concentrate of burnout values, graphicated on the X axis, the percentages of teaching performance, on the Y axis, in addition to the regression line obtained from the model resultant from the regression analysis.

\[ y = -0.0902x + 89.267 \]
with an \( R^2 = 0.27764 \)

4 CONCLUSIONS

The linear regression model have a determination coefficient, \( R^2 = 0.27764 \), explains just slightly less than 30% of the variability of de burnout values is because the variability of de teacher performance values. It is estimated that this model can be used to analyze the relationship between burnout syndrome present in teachers and their classroom performance. It can be seen, both graphically and analytically, that the relationship between these two attributes is narrow, despite the low value of \( r = -0.526916 \).

The regression model presented here, \( y = -0.0902x + 89.267 \), can be used to predict the performance of teachers, based on the level of burnout in teachers.

It was determined that the professors of the Faculty of Computer Mazatlan, Autonomous University of Sinaloa, manifested a greater sufferance of the Professional Burnout Syndrome inversely proportional to age, the younger the are the higher rate of burnout the got. And regarding teacher performance evaluation, this is directly proportional to age, the younger they are the less skilled they seem to be in this segment.
The older teachers and, in this case, the more experienced as educators, have lower levels of burnout. This research also showed that in all age ranges women represent, in terms of quantity, a small percentage compared to men.

It would be appropriate to apply the MBI instrument at different times of the school year to determine when is that teachers are more worn out or exhausted and measure whether this has any implications on the teaching performance and academic performance of students.

Furthermore, this research could serve to take action and train young or inexperienced teachers in order to solve the problem of being at higher levels of exhaustion that more experienced teachers, undermining their professional labor.

We are working on improving the model obtained with this research and improve the Pearson correlation coefficient, with the goal of making it more accurate and a better predictor. Also working on this research relate to the prediction of academic performance of applicants to enter a university career, which so far has been able to predict with 60% certainty.

Similarly, continue testing and implementing mathematical methods - computational and data mining and neural networks in this area of research.

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REFERENCES


