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DOCTORAL FIELD: ENGINEERING AND MANAGEMENT



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SUMMARY

Ph.D.thesis

**Research on the design of an innovative
technical solution for assessing the state of
burnout from the relational perspective with
the organizational climate**

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This thesis represents an interdisciplinary approach with a character of originality and topicality integrating knowledge, concepts, methods, techniques and tools in the field of psychology, management and engineering sciences.

The approach is based on the integration of research results considering the influence of organizational climate on the state of burnout and research on the design of a system for assessing and predicting the state of burnout of school principals in southern Israel, with the goal of validation of this system.

Thus, through the proposed approach, methods, techniques and tools belonging to different disciplines are being transferred, hence obtaining a burnout evaluation/prediction system that has as input elements the results of organizational climate analysis, burnout evaluation and results of physiological parameters measurement which are based on an algorithm that uses an artificial neural network. Through this approach, the specialist will be assisted by a system that *learns on its own* and that becomes more and more accurate in assessment as more data is entered.

The input elements in the proposed approach take into account the results obtained from the study of the literature, the results given by the author of the thesis and the results of the initial study, conducted with the purpose of argue the research and problem formulation by presenting the research premises and their contextualization.

The input elements are: *general elements*, resulting from the conceptual delimitations regarding the burnout phenomenon, the inventory of organizational and individual factors affecting burnout and the burnout assessment tool used in different fields of activity and *specific elements* that have allowed the identification of the research area and context, such as the characteristics given by the Arab schools in southern Israel (Bedouin area), elements that define the profile of the school principal in the studied area, specific stressors and applicable coping strategies, which are all potential sources of burnout results from the initial study.

The output elements represent the results of the evaluation by the proposed system of the level of burnout of school principals in relation to the organizational climate and individual factors reflected in the measured physiological parameters.

The system, as a result of research, is designed for school principals in southern Israel (Bedouin area), but can be customized/adapted to other areas of activity. Both the type of burnout assessment questionnaire and the organizational climate analysis questionnaire change at the entry level. The wearable device offers a *new meaning*, but a person must close the loop and take action with the help of the specialist based on knowledge of coping strategies (cognitive and emotional) in a person-centered approach.

Motivation for choosing the theme

Many complaints about work load, cumulative fatigue, failure to self-fulfill and even thoughts about early retirement, the teachers staff and even the management staff frequently absent from school or come late, loss of mental energy including functioning decrease as a result of continuing daily stress, lack of students' recognition and appreciation, lack of cooperation and support, the staff's difficulty to know the organization's characteristics and bureaucracy shows significant correlation between two main variables.

Due to the daily interactions and the dynamics of teachers and students or the management staff and teachers or even the dynamics of the educational staff and the parents, the staff feels significant increase in the emotional investment level (principal – student, principal – teacher or principal – staff and vice versa). This increase creates burnout with symptoms of emotional exhaustion or over-use in punishment for discipline. An additional problem is the constant substitution of staff, especially the teaching staff. The Fellahs (farmers) who come from Northern Israel and leave to their living place as soon they have the opportunity. It made the management to face the question whether to promote or invest in these people since they are considered temporary employees in school comparing to the local southern Bedouins that require significant escort and professional follow-up.

There is a deficit in the issue of boundaries and discipline and it expresses many times in minor break-ins to the boardroom even if important and intimate meetings are held there – schools are spread over a large space and it make control and monitoring processes or feedback difficult and do not allow proper communication among staff members or between the staff and management. Therefore, the problematic and difficult reality leads principals to spend a lot of time out of school trying to solve these school problems. The school staff often get involved in unusual and sometimes traumatic events, the working conditions are minimal and include a poor learning environment; there is lack of therapeutic resources as psychologist, educational counselor or didactic diagnosticians so the staff have to spend time in solving problems instead of investing it in other things. It is important to note that many children do not attend kindergarten and come directly to 1st grade, a fact that costs a lot of the staff's energy and investment to prevent these children from developing anxieties and fears. An important characteristic of these children is that most of them come from low socio-economic status background that causes low achievement level as expressed in the PISA tests.

The author of the thesis, as an educational psychologist, aims to find a solution to prevent the state of burnout among school principals. The situations experienced by them, the latent elements make their mark leading to a chronic exhaustion, sometimes even unconscious or impossible to surprise unless integrating several elements that determine it. Thus, the identification of the problem was the basis for establishing the purpose of the research, “built” on the basis of the main objectives and the main anticipated results, presented in fig. I.2.

The structure of the thesis is designed to meet the purpose and objectives of the research and to allow the achievement of relevant results. Thus, the first chapter is dedicated to the study of specialized literature. The author of the thesis starts from the concept of burnout and presents it from the point of view of a conceptual approach, of the organizational and individual determinants, respectively of the physiological approach. Before researching

the relationship with the organizational climate, the notions related to the organizational climate, respectively the school climate are clarified. Thus, the two terms of the relationship are approached, and the emphasis will be on highlighting the ways to evaluate this relationship through approaches and tools. The methods, techniques and tools used in the research are included in the second chapter dedicated to research methodology, treated as a product of the interaction between theory and empirical research. Thus, the statistical research in the third chapter aims to identify the particularities of the relationship between the organizational climate and the state of burnout of school principals. The author of the thesis transcends the boundaries of psychology as a basis and seeks solutions to the problem identified by the difficulty of evaluating this relationship due to those latent elements felt in his work as a psychoeducational, but not highlighted enough by questionnaires. These solutions are at the confluence between exploring management theory and practice and creativity and engineering innovation by proposing a technical solution to identify/alarm the burnout of school principals in southern Israel, based on the research presented in the fourth chapter of the thesis. A final chapter summarizes the results of the research undertaken grouping the contributions from a theoretical, methodological and applied point of view; presents the limitations of the research carried out and the perspectives of future research.

The identification of the aspects regarding the relationship between burnout and organizational climate was possible through a rigorous analysis of the literature that allowed the identification of the main landmarks of knowledge and highlighted the following aspects: the difficulty of identifying a complete and unanimously accepted set of descriptive factors used in the analysis of the organizational climate; the existence of pertinent arguments regarding the need to develop a new instrument for measuring burnout syndrome; by simply measuring the physiological parameters without knowing the reference values and trends will not provide relevant information on how to reach the state of burnout.

The study of the literature, documentation and personal experience of the author of the thesis allowed to identify the peculiarities of the relationship between burnout and organizational climate among school principals in southern Israel, peculiarities that give it uniqueness, supporting the originality of the approach and creating the premises for empirical research. These aspects revealed the main potential sources of burnout (through the initial study), the influences of demographic variables on the perception of the organizational climate and the state of burnout and the size of the organizational climate with the greatest influence on the occurrence of burnout (extended study).

The results of the study of the literature and empirical research were the starting point for the research, design and testing of a prototype system for assessing and predicting the occurrence of burnout and implementation of a neural network that estimates the current level of burnout among school principals in the subject area of research based on the inputs given by the results of the evaluation of perceptions considering the organizational climate (from the perspective of principals and teachers) given the existence of an inverse relationship between the organizational climate and the level of burnout and the values of measured physiological parameters (pulse and oximetry) subjects (school principals) from a physiological point of view.

The significant theoretical contributions included in the thesis are the following:

- Synthesis of literature information, containing the conclusions and approaches stated over time by researchers on the concept of burnout in relation to the organizational climate;
- Presentation of the instruments used in specialized studies for measuring and evaluating burnout syndrome from a physiological approach and in relation to the organizational climate with the focus on the schools in Israel;
- Identifying the peculiarities of the complex environment characterized by the Bedouin-tribal-hamula spirit, the coordinates of the educational system in general and especially those resulting from the Meitzav assessments in the Bedouin and Arab sector in Israel;
- Identifying the peculiarities of the relationship between burnout and organizational climate among school principals in southern Israel;

Practical and applied contributions consist of the following:

- Identifying the potential sources of burnout stressors among school principals by investigating the aspects of the communication between principal and teachers and analyzing the organizational climate considering essential dimensions such as: harmony, interpersonal relationships, trust and support;
- The hierarchy of stressors that determine the appearance of burnout among principals resulting in always present stressors with the same weight and importance are the following: the difficulties that a principal has in interacting with school teachers and even the dissatisfaction with the activity of teachers and students; the lack of support and cooperation between principal, teachers and students, but also the demands of the parents;
- Identifying the level of burnout among school principals and interpretation of the results obtained based on a comparative analysis between the results of research presented in literature, the results of the initial study and the results of extensive research in all schools in the Bedouin area of Israel
- Synthesizing the results obtained considering the influence of organizational climate dimensions on burnout dimensions and stressors of each burnout dimension among principals, thus determining which climate dimension changes under the action of which stressor.
- Identifying the coordinates of the relationship between organizational climate and burnout level expressed by a significant negative correlation between the two terms of the relationship and the absence of an influence of demographic variables on it.
- Designing a system for assessing and predicting the occurrence of burnout in order to develop a portable device that monitors the user for signs of exhaustion and alerts him if and when action is needed.

- Validation of the system based on the data acquired after testing the system so that it provides values of burnout levels across the spectrum from 0 to 100% based on pulse and oximetry measurements and based on the evaluation of the organizational climate.
- Implementation of a neural network that estimates the current level of burnout among school principals in the research area based on the input from the results of organizational climate perceptions assessing (from a principals and teachers perspective) and the values of physiological parameters (pulse and oximetry) that determine the current state of the subjects (school principals) from a physiological point of view.

Perspectives for further research development:

The main **limitations** of the research refer to the fact that the system was developed and tested only on subjects in the field of education. In order to be applied to other categories it will require rigorous testing and possibly network retraining using the same protocol. Following the validation of the protocol, no changes occurred, but only the need to refine the questions used in the DEC stage, which require adaptations for each topic. The accuracy of the results can be improved by logging additional data to drive the network and by adapting the collection protocol to provide data as accurate as possible.

The neural network can be applied to estimate the current level of burnout among school principals in areas with the same characteristics as those under study. For other schools, coming from areas with different characteristics, it is necessary to establish the initial perceptions of the organizational climate, while future research will be able to have a comparative analysis of the results.