

OPTIMIZING MANAGERIAL ENGINEERING: THE IMPORTANCE OF EDUCATION PROFESSIONAL CHARACTERISTICS

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Abstract- Educational management and leadership are of great importance at school level, playing a central role in the efficient operation and success of educational establishments. Our research aims to identify significances between professional characteristics of school principals and aspects of educational management, a quantitative methodology was used, found on a non-experimental and correlational study. Moreover, these variables are of prime importance for our study: Directors' initial training, most recent diploma obtained and number of years' experience. The sample is made up of 96 school principals: these are qualifying secondary schools (high school) belonging to the Casablanca-Settat Morocco regional academy. To gather the information, a questionnaire was completed by the school directors. We used IBM SPSS Statistics 29 software to process the data collected. The results show that the variable of head teachers' initial training was significant in relation to the variable of the aspect of continuing training, with an effect size of 68%, and also with the variable of the aspect of effective communication, with an effect size of 42%. In relation to the variable of the last diploma obtained, there was a significant relationship with the variable of the aspect of pedagogical innovation with an effect size of 12%, and with that of stress management with an effect size of 0.5%. As for the number of years of experience variable, a significant relationship was noted, with 14% of the variation explained by the pedagogical innovation aspect variable. At the end, it's imperative to make considerable efforts in terms of educational management to ensure that school's function optimally.

Keywords: Educational Management, School Principals, Correlation, Initial Training, Managerial Aspects.

1. INTRODUCTION

Today, no one can deny the importance of management and leadership to the profitability of any business. An educational establishment is a business in miniature that fits into the educational sector, and also has the right to be managed and run in a way that meets the objectives of academic success and performance.

Results and means represent an obligation that has a direct effect on the conditions and aims of educational work. For educational leaders in particular, managing an educational institution requires a commitment to strategic guidelines that define the ultimate objectives in terms of academic success and educational progress [1].

Educational management, also known as educational administration, focuses on the management, administration and leadership of educational establishments. Its aim is to guarantee the efficient operation of these establishments and optimize the quality of learning and teaching in general [2-3]. Educational management is based on key aspects such as: educational leadership, resource management, strategic planning, teaching quality, evaluation and monitoring, community relations, school climate, innovation and adaptation, etc.

The interaction and coherence between these managerial aspects ensures the creation of an environment conducive to the development of the school. The interaction and coherence between these managerial aspects ensure the creation of an environment conducive to student learning and success [4]. Educational leadership is that field which derives from managerial leadership and encompasses the skills, practices and responsibilities of educational leaders who are represented as principals (great leaders), school administrators, and also teachers. The principal is an educational leader who must be the model of leadership, integrity and commitment to education [5-6-7].

However, (Monica Gather, 2015) [8] asserts that the managerial role of a principal as leader is of paramount importance for the smooth running of the school except that it encompasses a wide range of responsibilities and tasks something that is considered a possible challenge but somewhat difficult to achieve. Its realization relies on the coherence between a host of factors [9]. Competence and commitment reside the two pillar factors and which can positively influence its educational leadership towards contributing to improving the quality of education and preparing students for citizenship for their future [10].

2. MATERIALS AND METHODS

2.1. Participants

We opted for a preliminary study, known as an exploratory scoping, involving a subset of 96 principals from qualifying secondary schools (high school) in the Casablanca-Settat regional academy. The sample was selected on a representative basis, by contacting the school principals prior to data collection. We ensured that principals were available and agreed to take part in the survey. The sample of this study represents an adequate size in relation to the general number of high schools in the Casablanca-Settat region, which is 157 qualifying high schools according to the statistics of the Ministry of National Education, Preschool and Sports [11], something that guarantees the reliability and significance of the results.

2.2. Instruments

A questionnaire was designed to collect quantitative data, based on a validated questionnaire from the organization for Economic Co-operation and Development (OECD), International Survey (TALIS) 2018 [12], a questionnaire designed to gather information on teaching and political actions in education. Our questionnaire is composed of 9 dimensions, one of which constitutes the professional characteristics of school directors and 8 dimensions encompass managerial aspects in education: Continuing education, School climate, Pedagogical innovation, Adapting to change, Effective communication, Equity and inclusion, Human resources management, Stress management. The questionnaire in general represents 57 questions, 3 of which in professional parameters and 54 questions in managerial aspects.

2.3. Conception

It is a nomothetic research study that aims to describe, understand and explain the educational situation observed. A quantitative approach has been developed: this is an empirical and correlational study that analyzes the dependence of managerial aspects on the professional characteristics of principals. It is undeniable that the findings could lead to a different perspective on pedagogical thinking.

2.4. Data Analysis

Analyses of the relationship between the 8 managerial aspects of education and the professional characteristics of school directors were carried out using the ANOVA statistical test. Significance analyses are provided in the ANOVA (p , η^2) tables. To study the dependencies between response variables and explanatory variables, significant correlations were used. They are presented as mean and effect size. Significance is attributed to the p value = 0.05. Using IBM SPSS Statistics 29 software, data were processed.

3. RESULTS

3.1. Descriptive Analysis

In this study, variables were used to measure and analyze the data collected.

3.1.1. Dependent Variables

The dependent variables in our study represent the professional characteristics of school directors. Three variables were chosen as they refer to the selection of specific qualities, skills and attributes that are paramount to success as an educational director.

Table 1. The last diploma obtained by the school director

		Frequency	Percentage	Valid %
Valid	Bac+2	17	16.8	17.7
	Bac+3	37	36.6	38.5
	Bac+4	37	36.6	38.5
	Bac+8	5	5.0	5.2
	Total	96	100	100.0

3.1.1.1. Diploma Obtained (DO)

The most recent diploma obtained by a school director is a dependent variable that can vary according to other variables. In Table 1, we can distinguish the variety of responses from principals according to the diplomas they have obtained. 17.7% of managers have a Bac+2 (Deug), while 38.5% have a license (Bac+3). Bac+4 or Master's degrees account for 38.5% of managers, while Bac+8 or Doctorate degrees account for 5.2%.

3.1.1.2. Initial Training (IT)

Initial training refers to all the teaching and learning a school principal has received at the start of his or her career, and represents a dependent variable in our study. Table 2 shows the different types of initial training a principal may have received.

Table 2. Initial training received by the school director

		Frequency	Percentage	Valid %
Valid	Training in school leadership or management	37	36.6	38.5
	Training for careers in teaching or education	53	52.5	55.2
	Training in pedagogical management	6	5.9	6.3
	Total	96	100	100.0

Remarkably, 55.2% of directors have received training in teaching or education, while 38.5% have opted for training in school leadership or management, leaving 6.3% who have received training in pedagogical management.

3.1.1.3. Professional Experience (PE)

It refers to the number of years of experience as a school principal. Table 3 shows the percentages of years of experience of our sample during our study. 19.8% of managers have between 1- and 5-years' professional experience, and 26% have between 5- and 7-years' experience. Finally, 54% have more than 7 years' experience.

Table 3. Years of experience as a school director

		Frequency	Percentage	Valid %
Valid	1-5 years	19	18.8	19.8
	5-7 years	25	24.8	26.0
	More than 7 years	52	51.5	54.2
	Total	96	100	100.0

3.1.2. Independent Variables

Factors which, in principle, are examined to determine their effect on other dependent variables. The independent variables in our study refer to educational management aspects.

1. Continuing Education: The process of acquiring new skills and knowledge throughout a principal's professional career, after he or she has completed initial training.
2. School climate: The environment within an educational establishment, encompassing the relational aspect of education.
3. Pedagogical innovation: The implementation of new educational practices and approaches to promote learning and the quality of teaching in general.
4. Adaptation to change: An important process that ensures the effectiveness and quality of education.
- e) Effective communication Facilitates learning and teaching in general, and creates a positive and productive learning environment.
5. Equity and inclusion: Two interdependent concepts whose aim is to offer all students equal opportunities to learn and succeed, whatever their personal characteristics, abilities or circumstances.
6. Human resources management: Concerns the management of educational personnel within the school. It is important to ensure the smooth running of the educational institution and the provision of effective education.
7. Stress management: This involves implementing strategies to deal effectively with stress and reduce its negative effects on the physical and mental health of educational staff.

3.2. Inferential Analysis

3.2.1. The Choice of Analysis of Variance (ANOVA)

Since we have categorical personal characteristics and want to compare the means of educational management dimensions between different groups of managers, ANOVA is the obvious choice. The significance of this difference can be quantified by calculating the eta-squared index (η^2), Tables 5, 7, 9.

- Around 0.01: small size effect
- Around 0.06: medium size effect
- Around 0.14 and over: large size effect

3.2.2. The Relationship between Personal Characteristics and Educational Management Aspects

Functioning and performance can be significantly impacted by this relationship. The null hypothesis of the ANOVA is that the variance of the dependent variable of the professional parameters (response variable) does not vary as a function of the variables of the educational managerial aspects (explanatory variables).

3.2.2.1. Diploma Obtained (DO)

Table 4 shows the results of the ANOVA statistical test. When correlating the Diploma obtained by school principals with managerial aspects, we find significance

for the aspect of pedagogical innovation ($p=0.01<0.05$), and the correlation effect size is 12%, showing that the effect is large (Table 5). There is a dependency between the dependent variable of diploma obtained and the independent variable of pedagogical innovation. This explains why the more innovative a director's pedagogical approach, the higher the diploma obtained. There is also a significant relationship between degree obtained and stress management ($p=0.007<0.05$), with an effect size of 0.5%, which is a small-sized effect, (Table 5). The variation in the DO variable is explained by the stress management variable, justifying stress management as an important point in a manager's academic graduation scale.

Table 4. Results of the ANOVA Statistical Test between the variables Diploma obtained (DO) and educational managerial aspects (* $P<0.05$)

		Sum of squares	dof	Medium square	F	Sig.
Continuing Education	Intergroups	0.187	3	0.062	0.740	0.531
	Intergroups	7.735	92	0.084		
	Total	7.922	95			
School climate	Intergroups	0.723	3	0.241	1.90	0.134
	Intergroups	11.641	92	0.127		
	Total	12.364	95			
Pedagogical innovation	Intergroups	2.183	3	0.728	6.41	0.001*
	Intergroups	10.441	92	0.113		
	Total	12.624	95			
Adapting to change	Intergroups	0.057	3	0.019	0.345	0.793
	Intergroups	5.101	92	0.055		
	Total	5.158	95			
Effective communication	Intergroups	0.031	3	0.010	0.555	0.646
	Intergroups	1.738	92	0.019		
	Total	1.770	95			
Equity and inclusion	Intergroups	0.096	3	0.032	1.03	0.382
	Intergroups	2.843	92	0.031		
	Total	2.939	95			
HR Management	Intergroups	0.013	3	0.004	0.168	0.918
	Intergroups	2.430	92	0.026		
	Total	2.443	95			
Stress management	Intergroups	0.827	3	0.276	4.26	0.007*
	Intergroups	5.954	92	0.065		
	Total	6.781	95			

Table 5. Effect size between degree obtained and managerial aspects

	η	Square Eta η^2
Continuing Education * DO	0.154	0.024
School climate * DO	0.242	0.059
Pedagogical innovation * DO	0.349	0.122
Adapting to change * DO	0.416	0.173
Effective communication * DO	0.105	0.011
Equity and inclusion * DO	0.133	0.018
HR Management * DO	0.0181	0.033
Stress management * DO	0.074	0.005

3.2.2.2. Initial Training (IT)

Table 7 highlights two significant relationships in terms of correlation between initial training and managerial aspects. Significance between the initial training variable and the continuing training factor is identified ($p=0.038<0.05$) with an effect size of 68%, i.e. a large effect size, (Table 6). This shows that there is a dependent relationship between the two variables. Continuing training can have an impact on initial training by complementing or updating it. There was also a

significant effect size ($p=0.018<0.05$) of 42% between initial training and effective communication. This is a large effect size (Table 6). It can be seen that the dependency between the response variable FI and the explanatory variable effective communication is quite clear, which explains why initial training depends on effective communication.

Table 6. Effect size between initial training (IT) and managerial aspects

	η	Square Eta η^2
Continuing Education * IT	0.260	0.068
School climate * IT	0.118	0.014
Pedagogical innovation * IT	0.202	0.041
Adapting to change * IT	0.169	0.029
Effective communication * IT	0.206	0.042
Equity and inclusion * IT	0.288	0.083
HR Management * IT	0.091	0.008
Stress management * IT	0.202	0.041

Table 7. Results of the ANOVA statistical test between the Initial Training (IT) variables and educational managerial aspects ($*P<0.05$)

		Sum of squares	dof	Medium square	F	Sig.
Continuing Education	Intergroups	0.536	2	0.268	3.37	0.038*
	Intergroups	7.385	93	0.079		
	Total	7.922	95			
School climate	Intergroups	0.171	2	0.085	0.652	0.524
	Intergroups	12.193	93	0.131		
	Total	12.364	95			
Pedagogical innovation	Intergroups	0.360	2	0.180	1.36	0.260
	Intergroups	12.264	93	0.132		
	Total	12.624	95			
Adapting to change	Intergroups	0.218	2	0.109	2.05	0.134
	Intergroups	4.940	93	0.053		
	Total	5.158	95			
Effective communication	Intergroups	0.146	2	0.073	4.19	0.018*
	Intergroups	1.623	93	0.017		
	Total	1.770	95			
Equity and inclusion	Intergroups	0.024	2	0.012	0.387	0.680
	Intergroups	2.914	93	0.031		
	Total	2.939	95			
HR Management	Intergroups	0.100	2	0.050	1.981	0.144
	Intergroups	2.343	93	0.025		
	Total	2.443	95			
Stress management	Intergroups	0.278	2	0.139	1.98	0.143
	Intergroups	6.503	93	0.070		
	Total	6.781	95			

3.2.2.3. Professional Experience (PE)

Table 8 shows that there is significance between the professional experience variable and the factor of pedagogical innovation as a managerial aspect ($p=0.039<0.05$) with an effect size of 14%. It is a large effect size, (Table 9). This indicates that pedagogical innovation depends on the school principal's professional experience.

Table 8. Results of the ANOVA statistical test between the Professional Experience (PE) variables and educational managerial aspects ($*p<0.05$)

		Sum of squares	dof	Medium square	F	Sig.
Continuing Education	Intergroups	0.060	2	0.030	0.358	0.700
	Intergroups	7.861	93	0.085		
	Total	7.922	95			
School climate	Intergroups	0.020	2	0.010	0.074	0.928
	Intergroups	12.344	93	0.133		
	Total	12.364	95			

Pedagogical innovation	Intergroups	0.849	2	0.425	3.35	0.039*
	Intergroups	11.775	93	0.127		
	Total	12.624	95			
Adapting to change	Intergroups	0.015	2	0.007	0.135	0.874
	Intergroups	5.143	93	0.055		
	Total	5.158	95			
Effective communication	Intergroups	0.090	2	0.045	2.49	0.088
	Intergroups	1.679	93	0.018		
	Total	1.770	95			
Equity and inclusion	Intergroups	0.020	2	0.010	0.321	0.727
	Intergroups	2.918	93	0.031		
	Total	2.939	95			
HR Management	Intergroups	0.087	2	0.044	1.72	0.184
	Intergroups	2.356	93	0.025		
	Total	2.443	95			
Stress Management	Intergroups	0.092	2	0.046	0.641	0.529
	Intergroups	6.689	93	0.072		
	Total	6.781	95			

Table 9. Effect size between Professional Experience (PE) and managerial aspects

	η	Square Eta η^2
Continuing Education * PE	0.087	0.008
School climate * PE	0.040	.002
Pedagogical innovation * PE	0.117	0.014
Adapting to change * PE	0.259	0.067
Effective communication * PE	0.054	0.003
Equity and inclusion * PE	0.226	0.051
HR Management * PE	0.083	0.007
Stress management * PE	0.189	0.036

4. DISCUSSION

First of all, we would like to remind you that the aim of our research is to study the significance of the relationship between the professional characteristics of school principals and aspects of educational management. It aims to identify any dependencies that may exist in terms of educational management aspects. The main results obtained will be discussed in terms of the significance of the relationships based on the objective of the study: to examine the correlation relationship between the professional characteristics of school principals (high school) and aspects of educational management. Our initial results show that there is a significant relationship between the professional characteristic Diploma obtained and the managerial aspect of educational innovation. This proves that there is a dependency between the two variables, which is explained by the positive influence of educational innovation on improving learning and skills development. Although the impact of pedagogical innovation on the last diploma obtained by the school principal is indirect, it can influence academic performance and the overall success of the school. Pedagogical innovation as a managerial aspect plays an important role in the development of school education [13].

It is linked to several levels, depending on the origin of the objective. In fact, innovation of educational pedagogical origin can be imposed in the form of collective action projects, possibly involving educational and pedagogical managers [14]. The results also show a dependency between the diploma obtained by the school principal and stress management. This means that the diploma obtained has an impact on stress management.

The more effective the stress management skills, the more likely we are to find a principal who has undergone training to a remarkable academic level. Stress management skills are an important asset for a school principal, helping him or her to promote a healthy school environment for all those involved in school education [15-9]. Ongoing training is essential for developing leadership skills and keeping abreast of the latest educational trends [16]. It positively affects the quality of teaching and management within the school, which involves adapting to change and managing effectively for the overall benefit of staff and pupils [17].

The results show that there is a significant correlation between the initial training of school heads and the aspect of effective communication, proving that a head who communicates efficiently has been initially trained with a solid and rich foundation in educational leadership [18-19-20]. Effective communication encompasses active listening, interpersonal communication and even writing and public speaking. Initial training confronts the headteacher with the issues and dynamics specific to education, facilitating communication and enabling him or her to understand the concerns, expectations and needs of the educational staff [21]. In principle, a school principal should excel at positively influencing his team and inspiring trust in order to establish collaborative educational relationships all through effective communication [22-23]. However, it is essential to note that ongoing training, personal development and professional experience often complement initial training. Effective communication is a skill that can be improved over time. Therefore, while initial training may guarantee the basics, it is usually supplemented by other parameters to successfully make a school principal an effective communicator [24].

If we look at the school principal's professional experience, the results show that there is a significant relationship between this parameter and the aspect of pedagogical innovation, which can be explained by a dependency relationship. Although pedagogical innovation is remarkable in a principal, his professional experience also seems eminent [25]. The influence of professional experience on educational innovation is based on a variety of factors, except that there are considerable general trends such as the accumulation of knowledge. A school principal with several years' experience automatically has an in-depth knowledge of the education system, the challenges facing teachers and the needs of students; experience also strengthens change management skills, and facilitates the effective conduct of the process of adopting new pedagogical practices [26]. An experienced school director usually has an extensive professional network - something that enables him or her to access ideas, resources and best practices for relevant initiatives and pedagogical innovation for his or her school [27-28]. Furthermore, according to results a significant influence between certain educational managerial aspects and the professional characteristics of school principals, proving that these professional parameters play a crucial role in effective school

management. However, the combination of management skills, leadership, knowledge of the educational sector and educational vision can lead to a positive and much more profitable impact on school management practices, contributing to an environment conducive to learning and student success.

5. CONCLUSION

The aim of our research was to correlate the professional characteristics of school principals with educational managerial aspects for a pedagogically effective interpretation. It was therefore imperative to begin by distributing the questionnaire that falls under the basis of the international survey (TALIS) 2018, a questionnaire intended for Head Teachers [12]. Through this study, we have obtained results which show that there is a link between professional characteristics and managerial aspects: pedagogical innovation, effective communication, continuous training, stress management, this in no way means that the other managerial aspects (adapting to change, human resources management, equity and inclusion, school climate) are not important. In principle, they are implicitly mentioned, but they should be emphasized during the initial training of school principals in accordance with the rules of educational art, because they are an essential lever and have an impact on school performance and success [29].

A school director should be well prepared to effectively meet the challenges and responsibilities of his or her educational position, including the continuous improvement that lies at the heart of professional development [30]. Well-structured in-service training will strengthen principals' educational management and leadership skills, keeping them up to date with the latest educational trends, pedagogical advances and educational policies [31]. The role of school principal remains dynamic. It is linked to the evolution of schools and development. Those involved need to be well equipped to carry out this mission [32]. What's more, they need solid guidance to carry out their role in the best possible way. Finally, it's hard to overlook the crucial role of the school principal, who plays an important role in society, shaping future generations and contributing to economic and social growth. His leadership and influence extend beyond the walls of the school and touch the whole of society.

The research in this field helps to inform educational management practices to improve the quality of education and foster academic success. Perspectives to consider:

- Introduce new educational managerial theories
- Include quality management by focusing on improving processes, policies and practices to ensure the delivery of high
- Quality education
- Integrate training elements related to adapting to change.
- Train future principals to understand and practice educational leadership.
- Evaluate the skills and professional educational practices of school principals and administrators.

Such a study may have several limitations, and it is important to take these into consideration in order to improve the quality of the research.

- Resource limitations: These include time and personnel constraints.

- Response bias: Participants may give biased or socially desirable answers, which may impact on the validity of the results.

- Generalization of results: In educational management, research results cannot be generalized due to cultural, structural or even political differences.

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