

# **Impact of the Preschool Program on the Socio-Connective Variables Developed by the Beneficiary Children: the Case of Rural Morocco**

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## **Abstract**

Currently, governments recognize the importance of investing in early childhood education programs. Since entry into elementary school is a critical transition period, it is useful to measure children's development before entry. The objective of this study is to evaluate the impact of the national preschool promotion program on the socio-connective variables acquired by the children who benefit from the program. The context chosen is that of Moroccan preschools located in rural areas. This work proposes a sequential methodology based on a conceptual analysis based on the SOR paradigm "Stimulus-Organization-Response", and an empirical methodology based on the estimation structural equations. The results of this work confirm the existence of a positive and significant relationship between the different components of the external and internal environment of the preschool program, and the skills acquired by the preschool children. Consequently, the results argue for the generalization of preschool education, particularly in rural areas, with support for public or community provision. Providing preschool education to those who are currently excluded is considered an efficient and equitable investment.

## **Keywords**

Public policy, preschool, structural equation, skills assessment

## **1. Introduction**

Early childhood is a crucial phase in the construction of the individual. It is a period of rapid development that leads to the acquisition of a battery of skills on which future physical, neurological and psychological constructions will be based. Investments in early childhood are most effective when they start as early as possible. This means that they should start with girls and boys at an early age to ensure they benefit fully from educational opportunities and are well prepared for pregnancy and parenthood later in life.

Note that millions of children around the world are missing out on the opportunities that quality early childhood development can bring. In the Moroccan context, public policies have focused on education and health, promoting the generalization of preschool promotion policies and the development of programs for access to prevention and health care for all children from conception.

Despite these efforts, the rates of indicators related to the two sectors of health and education are alarming. This is linked to the problem of supply, given the low density and dispersion of the population, which makes the provision of services very difficult both logistically and financially.

To remedy this situation and ensure the future success of today's children a quality preschool education is one of the best public investments. Students who receive a quality preschool education are better prepared for the transition to primary school. This study falls within this perspective. In this regard, and in order to contribute to the establishment of an effective educational program, we will attempt throughout this study to identify, through multidimensional statistical analyses, the factors of preschool programs that can promote or penalize their effectiveness.

### **1.1 Objectives**

The purpose of this study is to identify the characteristics of the preschool program environment that have an impact on its performance.

The performance of the program is defined as the interaction, observation and evaluation of the skills acquired by preschool children (cognitive and socio-emotional skills), as a result of their passage through the preschool system.

Our main contribution consists in evaluating the impact of the characteristics of the educators (age, level of education, gender), as well as the classifications by sex and by number of children in preschool age, on the skills acquired by the children acquired from the program. It should be noted, that the majority of studies on the evaluation of the preschool program in Morocco have only concerned impact evaluation studies carried out by state bodies specializing in the evaluation of public policies.

## **2. Literature Review**

This paper proposes a research methodology based on a conceptual analysis using the Stimulus- Organism-Response paradigm. We have used this approach because we believe that it provides a holistic and comprehensive theoretical framework for examining the overall state of the program and the organizational environment in which it operates.

Note that the SOR paradigm was first introduced into Management Science by (Donovan and Rossiter 1982) in an article entitled "Store Atmosphere: An Environment Psychology Approach".

The intrinsic relationships between the three variables of the SOR model conceive the stimulus and the organization as the independent and the mediator variable, and the response as the dependent variable (Tehand et al. 2014).

### **Conceptualization of the organism in the SOR paradigm**

By definition, an organism's response in the SOR paradigm is any internal response at Stimulus (Mehrabian and Russell 1974). These internal responses are necessary to elicit a behavioral response and are intended to avoid maintaining the relationship between the organism and the stimulus object (Sweeney and Wyber 2002).

This approach, which seeks to explain the influence of the organization, places more emphasis on the organizational structure (Belsky 2006). It shifts the discussion of internal factors that promote program effectiveness to factors inherent in the organization. Indeed, some authors believe that preschoolers behaviors in organizations change according to the situations in which they find themselves (Parcel and Dufur 2001), and that the characteristics of organizations are more likely to shape preschoolers acquired skills than their own characteristics (Reynolds 1994).

In this sense, this approach provides an interesting explanation of some of the arguments generally put forward by authors who limit themselves only two approaches based on the individual characteristics of program beneficiaries and actors to explain the effectiveness of the preschool program. Indeed, this approach emphasizes that the external environment of the program directly influences the skills and abilities acquired by preschoolers, which pushes them to acquire the societal, language and connective skills necessary for their transition to primary school or not.

### **Conceptualization of the stimulus in the SOR paradigm**

According to the SOR paradigm, the stimulus should possess qualities capable of generating a response. Advancing this idea, (Berlyne 1960) explained that all stimulus possess characteristics that impact the arousal potential of

preschoolers. Specifically, he proposed three different characteristics:

- Psychophysical characteristics: these are variables that depend on the physical specifics of the stimulus.
- Ecological characteristics: these are variables associated with the different specific requirements for health and survival.
- Collective characteristics: these are the variables that are provoked only in a comparative situation, the taste of various stimulus elements or the taste of various stimulus elements with previous experiences.

This author supported the idea that any stimulus could be described by the amount of information provided. For example, a primed stimulus could be considered a large amount of information, whereas a simple stimulus could be considered a small amount of information.

### **Conceptualization of the response in the SOR paradigm**

Several studies have shown that an individual's internal affective, cognitive states when exposed to the stimulus and agency of their interaction environment influence their behavior (Kim and Lennon 2013).

According to (Lebrun 2007), who emphasize that learning can no longer be reduced to acquiring specific knowledge in fundamental areas, learning also requires the implementation of skills that are part of the "to know how to become", that is to say set of values, attitudes and behaviours that make it easier for individuals to be more autonomous, more confident in their learning possibilities and more able to develop projects.

Applying the lessons of the SOR model, influences of the program's external and internal environment on the skills acquired by preschool children are used to develop a model to study how the skills acquired by children following access to the preschool program will develop following changes in that environment.

Let's remember that, this model explains how a perceived change, a stimulus (S), leads to a behavioral intention, a behavioral response (R). However, this response is also impacted by an organism variable (O) (Van Laere 2018). On the basis of this conceptual construction, a series of distinct dependency relations can be predicted. The proposed conceptual model, is as follows (figure 1):

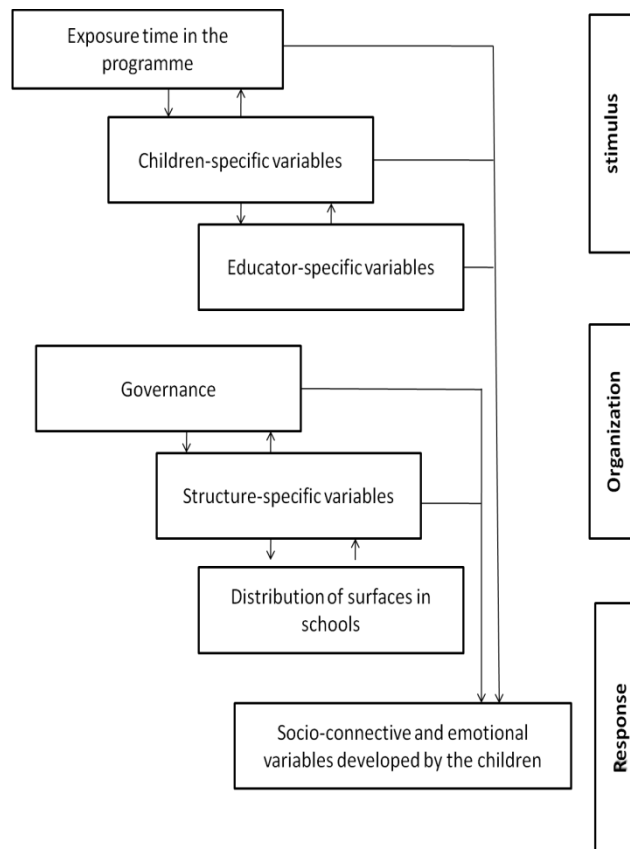


Figure 1. Proposed theoretical model

The conceptual model therefore has three blocks. The first block refers to the Stimulus, which is a dimension that groups the different internal observable environmental aspects, the second block concerns the an organization, which refers to the external environment of the program, and the last block involves a very important observable dimension, the Response, which is defined by the number of skills acquired by the children benefiting from the program.

It should be noted that the Response dimension is measured by six learning areas: D1: Exploitation of self and environment, D2. Organization of thought, D3. Linguistic expression and communication, D4. Sensory-Motor Behavior, D5. Artistic and aesthetic aspect, and D6. Values and rules of living together

### 3. Methods

The empirical methodology is based on a multivariate statistical analysis using the Principal Component Analysis technique for the exploratory analysis and an econometric analysis based on the PLS method for the confirmatory analysis to confirm or refute the research hypotheses.

The idea is to proceed first by testing the data collected from the selected sample. The test consists of purifying and verifying the dimensionality of our measurement instruments using factorial analyses without and with orthogonal rotation of the VARIMAX type, eliminating the items that do not contribute significantly to the measurement of the indicators measuring the concepts. Then, it will be easy to test the research hypotheses by a confirmatory analysis of the measures based on new data, according to the approach of (Fornell and Larcker 1981) which is based on the criterion of discriminant validity of the constructs (AVE). We also mobilised a second approach, which is based on the calculation of the loadings Matrix.

The estimation and validation of the measurement model are carried out by the Partial Least Squares (PLS) analysis, which is well adapted to the theoretical model adopted for our research. This analysis concerns the estimation of

composite variables known as formative variables. This approach has two major advantages in our opinion. The first one is related to its flexibility in terms of sample size and normality of the distribution, the second one is related to the capacity of this method to analyse very complex models, which corresponds perfectly to the nature of our model and our data.

The decision on which software to use was not a difficult one. We choose to "run" the model using Smart PLS software (Wong 2013), as this research tool offers a comprehensive set of tests, not least because of its user-friendly interface.

#### **4. Data Collection**

The source data for our study was collected from the Moroccan Foundation for the Promotion of Preschool (FMPS)<sup>1</sup>. The FMPS<sup>2</sup> was created in 2008, as a non-profit association, at the initiative of the Moroccan Higher Education Council.

The preschool structures, object of our parent population, concerns a total number of 3080 functional preschool structures under the 2020-2021 school year, and which covers twelve regions of Morocco, including 80 provinces and prefectures, 901 rural communities and 2960 villages.

The study population for the quantitative research was based on a non-probability and purposive sampling of 1180 preschools, 3271 preschoolers, 2539 educators, distributed across: 10 regions of the Kingdom, 43 provinces and prefectures, 424 rural communities and 1180 villages.

The methodology adopted to select the sample is as follows:

- Retain a confidence level of 95%;
- Retain a margin of error of 2%;
- Adopt a T-stat relative to the normal law which is 1.6448.

It should be noted that the FMPS carries out an evaluation of the skills acquired by the preschool children at the end of each semester for each school level, Middle and Great Section school.

#### **5. Results and Discussion**

Two complementary analyses were conducted during the empirical study. An exploratory analysis to explore the measurement instruments and a confirmatory analysis to affirm or refute the research hypotheses.

##### **5.1 Numerical Results of the exploratory study**

The calculations are carried out using the STATA software version 14.2. This analysis is essential in order to be able to detect and verify anomalies concerning the uniformity of the data, (Table 1).

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<sup>1</sup>The choice of the FMPS, is explained by the experience and know-how accumulated by the foundation in the development of preschool education in urban and rural areas throughout the Moroccan territory, and through the various partnerships made.

<sup>2</sup>The FMPS has developed and implemented a new preschool system that meets the standards of educational excellence, and accessible to all parents, regardless of income and offering a quality of reception, supervision and offering a quality of reception, supervision, and teaching equally where verities located in the Morocco.

Table 1. Principal component analysis after rotation

Variable	Items	Abbreviation	Definition	Rotated components					
<b>Variable children</b>				<b>Component 1:</b> Number of children in preschool	<b>Component 2:</b> Gender distribution of children attending school MS				<b>Unexplained</b>
	<b>Number of Girls</b>	NEP1	The number of girls attending preschool in the same facility	0.4147					0.1716
	<b>Number of Boys</b>	NEP2	Number of boys attending preschool in the same facility	0.4101	0.3017				0.1748
	<b>Number of girls enrolled Middle Section (MS)</b>	RGESMS1	The number of preschool girls in the Middle Section school level within the same structure		0.6205				0.1664
	<b>Number of boys enrolled Middle Section (MS)</b>	RGESMS2	Number of preschool boys for the Middle School level section within the same structure		0.6257				0.1624
	<b>Number of girls enrolled Grande Section (GS)</b>	NEP3	Number of preschool girls for the Grande Section school level within the same structure	0.5640					0.1711

	<b>Number of boys enrolled Grande Section (GS)</b>	NEP4	Number of preschool boys for the Grande Section school level within the same structure	0.5651					0.1673
<b>Variable educator</b>				<b>Component 1:</b> educators aged between 25 -40 years old	<b>Component 2:</b> characteristics of educators aged between 18 and 25	<b>Component3:</b> characteristics of educators aged between 55 and over	<b>Component4</b> : educational level of educators	<b>Component5:</b> educational level baccalau reate	
	<b>Age 18 - 25</b>	CEA18-251	The number of educators aged 18-25 by facility		0.7549				0.1613
	<b>Age 25 - 40</b>	GENR 1	The number of educators between 25-40 years of age by facility	0.7363					0.1249
	<b>Age 55 and over</b>	CEA55+1	The number of educators over 55 years of age per facility			0.7047			0.3417
	<b>Level Bac</b>	NIVEAU BAC	The number of educators, educational level level bac per facility					0.8599	0.1912
	<b>Bac</b>	CEA18-252	The number of educators with a Bachelor's degree per facility	0.3792	0.5566				0.1874
	<b>Bac+1</b>	NI 1	The number of educators with BAC+1 level of education per structure				0.5749		0.5921

	<b>Bac+2</b>	CEA55+2	The number of educators with a BAC+2 level of education per facility			0.6848			0.3155
	<b>Bac+3</b>	NI 2	The number of educators with a BAC+3 level of education per structure				0.6893		0.4754
	<b>Men</b>	GENRE 2	The number of male educators per facility	0.4796					0.4614
<b>Variable evaluation of skills</b>				<b>Component1:</b> Societal skills acquired	<b>Component 2:</b> Language and Connective Skills acquired				
	<b>D1 : Exploitation of self and environment</b>	HLCA1	Be willing to possess the tools of observation, self-discovery, and environmental and technological space		0.4461				0.7128
	<b>D2. Organization of thought</b>	HLCA2	To be willing to possess the tools of thought organization and construction of primary mental processes		0.6291				0.5027
	<b>D3. Linguistic expression and communication</b>	HLCA3	Be willing to acquire linguistic and communication tools that can help your read and write		0.6285				0.4956



	<b>D4. Sensory-Motor Behavior</b>	HSA1	To be willing to control one's movements (large and small gestures), to direct, organize and execute them, from different body positions, and to achieve sensory motor coherence	0.5013					0.6616
	<b>D5. Artistic and aesthetic aspects</b>	HSA2	To be willing to receive and accept artistic and aesthetic products and to acquire the basic tools of artistic expression	0.5270					0.6259
	<b>D6. Values and rules of living together</b>	HSA3	To be willing to receive and accept religious and national values and the rules of common life	0.6666					0.4239

Nine constructs were retained, namely: Number of children in preschool, breakdown by gender of MS school children, educators aged 25 to 40, characteristics of educators aged 18 to 25, characteristics of educators aged 55 and plus, level of education of educators, educational level baccalaureate level, acquired societal skills and acquired language and connective skills.

## **5.2 Numerical Results of the confirmatory study**

The aim of this study is to estimate the quality of the research model and to evaluate the quality of the overall model.

We first proceeded to the convergent validity for the measurement of the existence of a strong correlation intensity between the manifest variables of the same instrument (latent variable) measuring the same phenomenon (dimension), this result, allows to admitting the convergent validity, (table 2).

Table 1. AVE value of constructs

<b>Factors</b>	<b>Average Variance Extracted (AVE)</b>
Characteristics of educators aged 18-25	0.724
Characteristics of educators aged 55 and over	1.000
Level of qualification level Baccalaureate	1.000
Level of qualification	1.000
Number of preschool children	0.720
The gender distribution of children enrolled in the MS	0.833
Educator variable	0.433
Variable of preschoolers	0.421
Educator gender	0.219
The gender distribution of children enrolled in the MS	0.526
Educator variable	0.644
Language and Connective Skills acquires	0.433
Societa lskills acquired	0.421

Then we proceeded to the validation of the structural model, this procedure retains a graphical scheme Path related to the structural equations (Path Weighting Scheme), this validation was carried out by using the Bootstrap method, (Figure 2).

### 5.3 Graphical Results of the confirmatory study

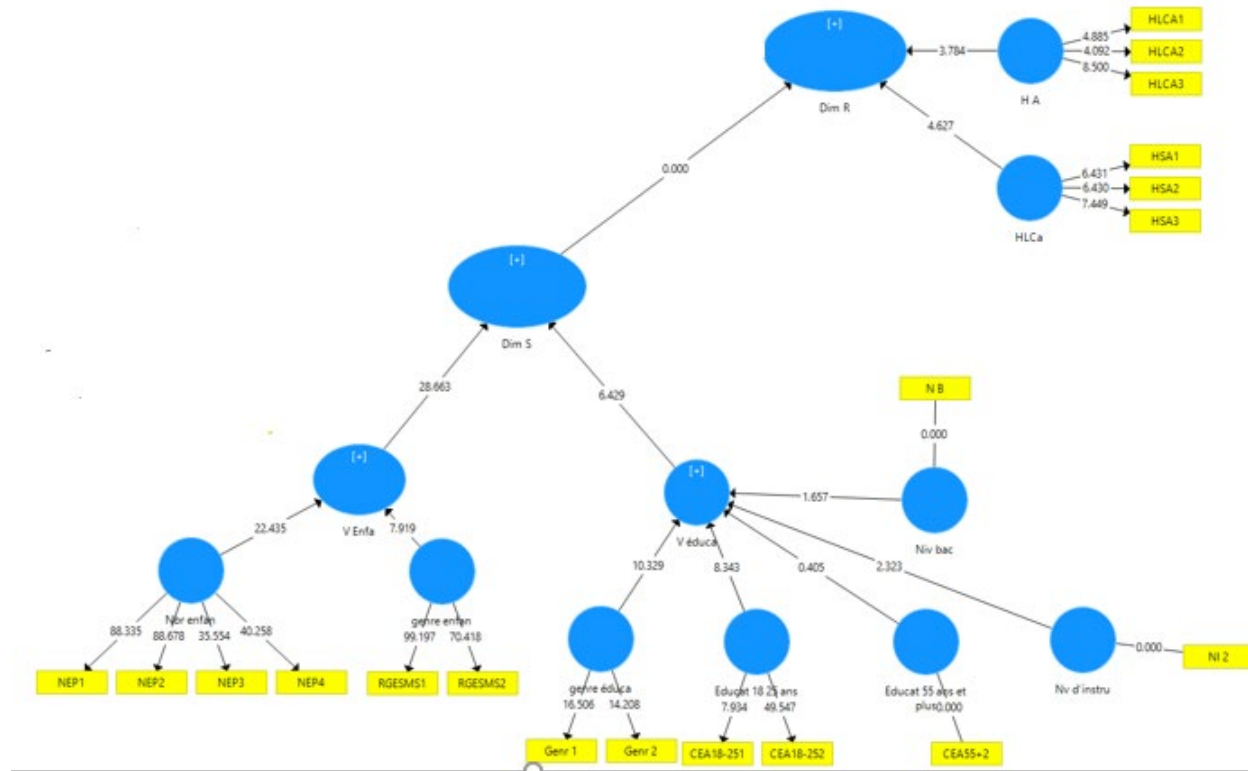


Figure 2 . The statistical significance of parameters the global model after Bootstrap

Following this step, the elimination of the Items whose Bootstrapping value is lower than 1.96 is mainly iterative. It is therefore necessary to first remove the Item(s) whose value is lower than this rate, and then proceed to the estimation of the Bootstrapping.

The final result obtained allows us to retain the following global model, (Figure 3):

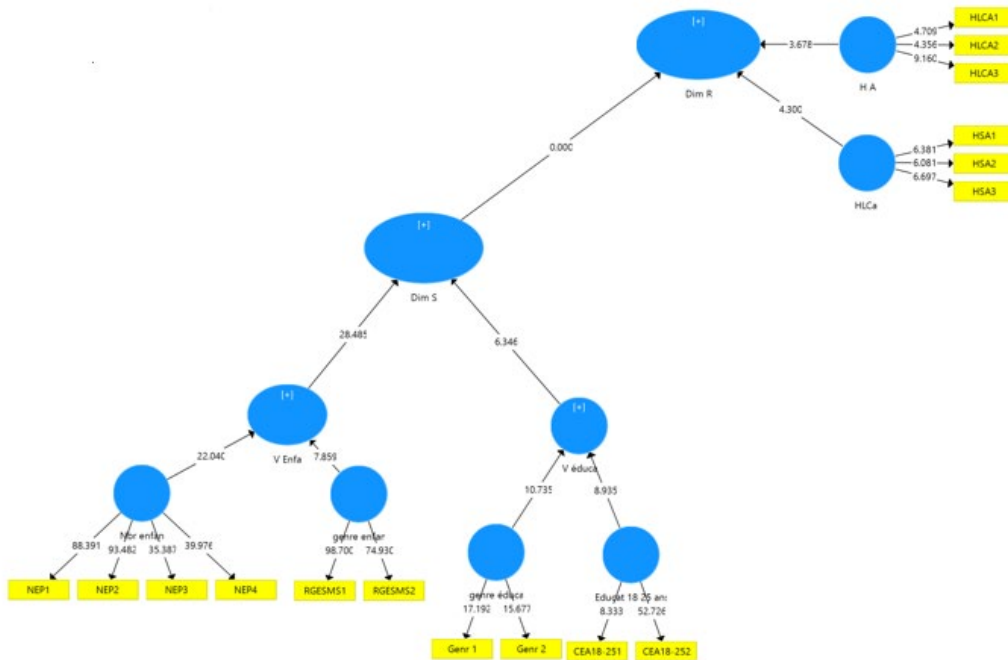


Figure 3 . Bootstrapping after spinning

Note that after cleaning, the factors concerning educational level baccalaureate, the level of education and the characteristics of educators aged 55 and over were removed. In a second step, the quality of the overall model was evaluated through the indicator of the coefficient of determination  $R^2$ , and then the research hypotheses specific to the overall structural model were tested (Table 3).

Table 2. Assessing the explanatory power of the structural model

Dimension / Variable	$R^2$	R Adjusted square
Dimension Stimulus	0.999	0.999
Dimension Response	0.999	0.999
Variable Educator	0.999	0.999
Variable Preschooler	0.999	0.999

The coefficient values of the construct determinations post value of 0.999. This suggests that these values are very acceptable and therefore reflect a good quality of the relationships between constructs.

### 5.3 Validation

For the testing of the research hypotheses of the overall structural model, only the two dimensions (Stimulus, Response) are concerned. It should be remembered that in this article the results of the tests of the Organization dimension will not be presented.

Its tests concern a single linear hypothesis relating to the relationship between the Stimulus dimension and the response dimension (Hypothesis  $H_1^S$ ) and six sub-hypotheses concerning the impact of the concept (Stimulus) on the skills acquired (Response), namely:

- Hypothesis  $H_{11}^S$ : the relationship between the number of children in preschool and the performance of the

- preschool program.
- Hypothesis  $H_{12}^S$ : the relationship between passage by the Middle Section school level and the performance of the preschool program.
- Hypothesis  $H_{13}^S$ : the relationship between gender of preschoolers and the performance of the preschool program.
- Hypothesis  $H_{14}^S$ : the relationship between the gender of educators and the performance of the preschool program.
- Hypothesis  $H_{15}^S$ : the relationship between the level of qualification of educational personnel and the performance of the preschool program.
- Hypothesis  $H_{16}^S$ : relationship between the age of educational personnel and the performance of the preschool program.

The figure 4 above gives us an overview of the linear relationships after rotation with the Bootstrapping software.

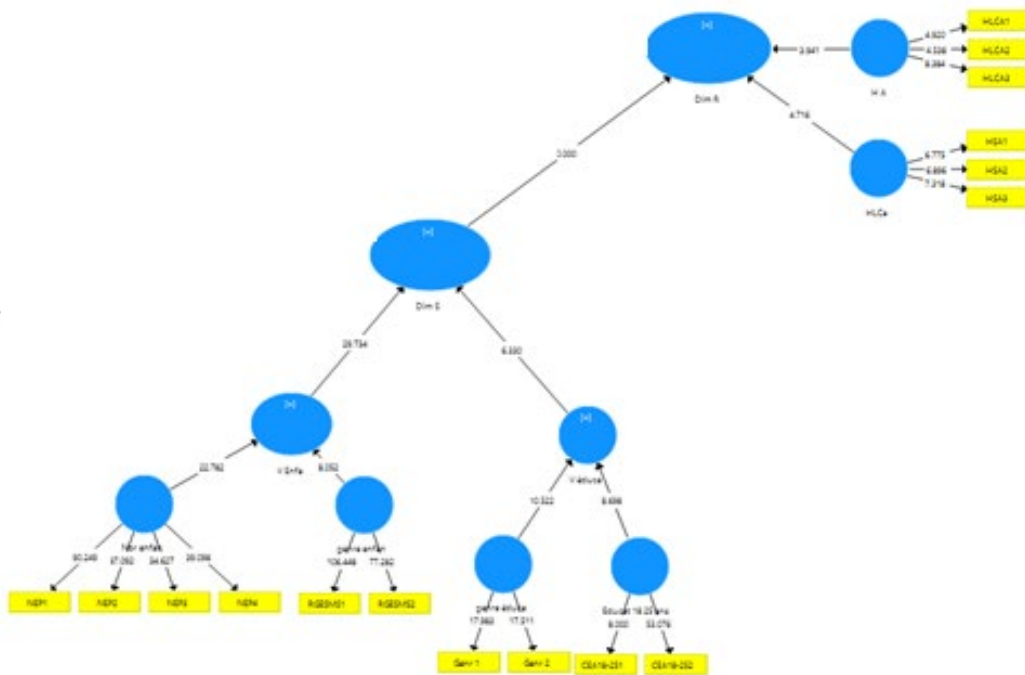


Figure 4: Bootstrapping with linear relationships

The validation of the research hypotheses, specific to the overall structural model is presented in the following table 4.

Table 3 : The results of the tests of the hypotheses concerning the organism dimension and the response dimension

Hypothesis	Factors	Parameter	T-Stat	P value	Result	
<b>Hypothesis H<sup>s</sup><sub>1</sub></b>	Language and Connective Skills acquired	0.675	4.682	0.000	Accepted	Validated hypothesis
	Societal skills acquired	0.629	3.864	0.000	Accepted	
<b>Hypothesis H<sup>s</sup><sub>11</sub></b>	Number of children in preschool and the child variable	0.842	22.095	0.000	Accepted	Validated hypothesis
	The child variable and the Stimulus Dimension	0.909	31.277	0.000	Accepted	
<b>Hypothesis H<sup>s</sup><sub>12</sub></b>	The passage through the MS and the children variable	0.332	7.779	0.000	Accepted	Validated hypothesis
	The Child Variable and the Stimulus	0.911	29.194	0.000	Accepted	
<b>Hypothesis H<sup>s</sup><sub>14</sub></b>	The gender of educators and the educator variable	0.618	10.898	0.000	Accepted	Validated hypothesis
	The variable educators and the Stimulus	0.250	6.307	0.000	Accepted	
<b>Hypothesis H<sup>s</sup><sub>15</sub> and H<sup>s</sup><sub>16</sub></b>	Dimension Educators 18-25 and the educator variable	0.607	9.207	0.000	Accepted	Validated hypothesis
	The Educator Variable and the Stimulus Dimension	0.250	6.307	0.000	Accepted	

The analysis of the results showed us that the model supports a number of hypotheses. Only one hypothesis could not be tested, because the items concerning it were deleted during the exploratory analysis, namely hypothesis H<sup>s</sup><sub>13</sub> concerning the existence of a relationship between the gender of preschool children and the performance of the program. Nevertheless, it should be noted that for many of our hypotheses, the results are in line with our expectations and consistent with the literature review and previous results obtained by other researchers. Therefore, the stimulus dimension has a positive and significant impact on the response dimension H<sup>s</sup><sub>1</sub>. This suggests that the characteristics of preschoolers and educators have a positive impact on program performance.

To this end, the validation of hypothesis H<sup>s</sup><sub>11</sub>, allowed us to recognize that the number of preschool children has a positive and significant influence on the expected results of the preschool program. The results of this test are consistent with the existing literature (Tazouti 2011), which emphasizes on the importance of the number of preschoolers on the success of the program. Indeed, the greater the number of children enrolled, the more successful the program.

The second validated hypothesis, H<sup>s</sup><sub>12</sub> of the Stimulus model, highlights the positive and significant relationship between the passage of children through the Middle Section school level and the maintenance of the positive effects of the preschool program, the longer the preschool program lasts, the more it is more efficient. These results are in

line with the work carried out by (Chankseliani et al. 2021) which emphasize the duration of exposure to the program<sup>3</sup>. In view of its results, the public actors in charge of the implementation of the program must set up communication campaigns with parents on the importance of their children benefiting from the preschool program over a period of two years before entering at primary school.

The third hypothesis H<sup>s</sup><sub>14</sub> analyzed and validated in the tests, concerns the relationship between the gender of the educators and the response dimension. The results obtained allowed us to confirm the significant and positive impact of the gender stereotype on student performance. In other words, the positive impact of having a male educator on the different skills developed by preschool children, contrary to the existing literature that highlights a positive correlation between the women educators and program effectiveness (Gervais-Karpowicz 1995). For this reason, the actors in charge of program implementation must put in place communication campaigns to encourage men to apply for these positions. It should be noted, that in rural Morocco, families believe that teaching by a male educator is more beneficial for their child.

The validation of hypotheses H<sup>s</sup><sub>15</sub> and H<sup>s</sup><sub>16</sub> allowed us to identify a positive and significant relationship between the age of the educators and their level of qualification and the cumulative learning through children after their passage through the preschool. The purpose of this test is to identify the characteristics of the educators that have the greatest impact on the program.

According to the results obtained, educators with an age between 18 and 25 have a greater impact on the skills acquired by the beneficiaries. With regard to the educators' level of education, the results are the opposite of the existing literature (White et al. 1985-1986)<sup>4</sup> educators with a Baccalaureate level of education have the greatest impact on the skills acquired by the beneficiaries.

#### **5.4 Proposed Improvements**

The main orientations drawn from the results of the studies carried out are as follows

- Establish preschool structure in geographic areas with a significant number of preschool-age children.
- Increased time of exposure of the children to the program by maintaining the two grade levels of Middle and Great Section school.
- Increase the proportion of men in the recruitment process and give preference to educators in the 18 to 25 age group, with a baccalaureate diploma.

### **6. Conclusion**

As a conclusion, and through the research within the SOR paradigm, we have accepted that there is a positive and significant relationship between the internal and external environment of the programme and the skills acquired by the preschool children. This relationship is significant for each individual construct. That is, the variables measuring the internal and external environment are significant.

The results argue for the widespread provision of preschool education, particularly in rural areas, with support for public or community provision. Offering preschool education to those currently excluded is considered an efficient and equitable investment.

In this regard, it should be noted that policies to improve equitable access to quality preschool education in rural areas, particularly for girls aged 4-6 years, are very limited and, if they exist, are most often offered in traditional structures. To remedy these shortcomings, government policies must expand the provision of quality preschool education services

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<sup>3</sup>According to the authors, the shorter the duration of exposure to the program (between six and eleven months), the less significant the impact on child development.

<sup>4</sup>According to the results of the study: the level of training of educational staff is positively correlated with program effectiveness.

that promote safety, inclusion and sustainable outcomes, either through the creation and/or equipping of preschool facilities in areas of need, and according to standards that guarantee the quality, accessibility and sustainability of its infrastructure and teaching materials, and also through actions to strengthen teachers qualifications and working conditions, or awareness raising and information sessions that promote playful learning for young children at home, which supports the stimulation of learning in the family environment and which, in the event of local school closures (such as in the case of natural disasters or pandemics), offers a means of mitigating learning losses.

Care should also be taken that tools are in place to allow to maximise the impact of preschool reform on access to better quality education for all children, notably by (i) continuing the expansion of a network of high quality pre-schools, (ii) improving the quality of educational processes and focusing on pedagogical practices in the classroom, and (iii) improving the measurement of children's cognitive and non-cognitive development.

The present status of preschool educators must be reviewed in order to enhance and perpetuate the profession of educator, especially in rural areas, by providing bonuses to staff working in these precarious environments.

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## Biography

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