

## STUDENTS' SELF-EFFICACY AND FEURSTEIN INSTRUMENTAL ENRICHMENT

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**Abstract:** *The present experimental study aims to highlight the role of the instrumental enrichment program proposed by Reuven Feuerstein in improving pre-adolescent learning facilitating attitudes. We refer to perceived self-efficacy and locus of control. These traits were evaluated in a 40 children group at the beginning of the experimental stage with specific tests. The group was also divided into control group and experimental group. The intervention involved the organization of 12 workshops during which two tools from the Feuerstein method were used - Organization of points and Instructions. The statistical processing of the obtained data highlighted a significant increase in the perceived self-efficacy of the students we worked with, as well as a shift of emphasis from the locus of external control to the locus of internal control. These aspects allow for a better involvement in learning by increasing students' responsibility and self-confidence.*

**Key words:** *learning; Feuerstein Instrumental Enrichment; self – efficacy; locus of control; pre – adolescent*

### 1. Mediated learning theory and the Feuerstein method

The Instrumental Enrichment Program (FIE) was developed by Feuerstein and his colleagues between 1950 and 1960 while working with Youth Aliyah - an Israeli agency for the placement of children of Jewish immigrants after World War II. Many of these children had suffered traumatic and emotional loss as a result of separation or the loss of their parents during the war. With the aim of placing these children in educational institutions in Israel, he experienced great dissatisfaction with the results obtained by them in the joint intelligence tests applied. Measurements showed them to be between three and six years old behind children of the same age in Israel.

In this context, Feuerstein made every possible efforts to find a way to improve the performance of these children, thus developing the Theory of Cognitive Structural Modifiability followed by the Theory of Mediated

Learning Experience. The theory of Cognitive Structural Modifiability aims to explain the different level of development of children's cognitive abilities, being defined as the ability of the individual to change or modify the structure of cognitive processes or thinking in response to changing environmental requirements. The theory includes a model that explains how learning takes place, which not only explains why individuals experience a different cognitive development, but also the main role of the interaction, called the Mediated Learning Experience (Maxcy, P., 1991).

According to Feuerstein's learning theory (2002, 1995), the first and the most natural way of learning is through direct exposure to stimuli or the environment. This model is based on two other different theories, namely the behaviorist theory stimulus - response (S-R) and the constructivist one which also introduces the body into the model: stimulus - organism - response (S-O-R). Feuerstein also extends this model and includes the human component, usually an adult, which interposes itself between the child (organism) and the learning stimulus and then again between the child (organism) and the response. Thus Feuerstein's model becomes: stimulus - human intervention (Human = H) - organism - human intervention - response (S - h - O - h - R). What is important to note is that Feuerstein does not minimize the role of S-R or S-O-R models in the aquirement process, he only argues that the quality of learning is further influenced in a learning process mediated by a significant adult in the child's life.

Feuerstein's theory is also influenced by Vygotsky's notion of the Child's Zone of Proximal Development. Successful mediated learning involves the existence of three elements that, according to Feuerstein, must be present during instrumental enrichment sessions:

- **The intentionality and reciprocity** of the mediator is manifested through attitude, facial expression and action. It is a conscious intention, even if only for the moment, of the mediator to develop a piece of the child's knowledge. It is a clear signal that the act of learning is deliberate and not random.
- **Transcendence** implies that through mediation, the knowledge transmitted is not only intended to solve the current problem, but also to make a connection with the whole or other areas of interest. Through the discussions initiated by the mediator, a process of analytical thinking is developed through which the child is mediated to discover analogical relations between the concept and another life experience.
- **Purpose** by mediating the meaning that learning has for the child. The mediator also mediates the feeling of success and determines the child to reflect not only on the solution of the problem, but also on the way in which the solution was obtained and the

generalizations that derive from it. (Dughi, Ardelean, 2020; Dughi, Dughi, 2020)

Additionally to these three elements, without which the mediation process is not considered to take place, Feuerstein also proposes the presence of other elements such as: mediation of the sense of competence, mediation of rules of behavior, mediation of participatory behavior, psychological individualization and differentiation, mediation goal planning, mediating the challenge of interest, mediating for self-change, mediating the individualization of the optimistic alternative and mediating the feeling of belonging (Todor, Dughi, Dughi, 2021; Todor, 2014).

The model proposed by Feuerstein supports the idea that thinking and cognitive structures are open systems that can be changed at any age, but especially during preadolescence and adolescence, a period for which the instrumental enrichment program was originally created. While Feuerstein rejects the idea of critical or optimal age for cognitive development, the materials used in the program seem to be an effort to construct tasks that reproduce for adolescents cognitive experiences that should have been mastered from a younger age according to developmental stages. of Piaget (Maxcy, P., 1991).

The main objective of using the Instrumental Enrichment Program is that of cognitive modifiability, but it is operationalized by other “sub-objectives such as:

- correction of cognitive impairment
- introduction of an intrinsic motivation in the development of cognitive functions
- developing intrinsic motivations for increasingly complex tasks
- facilitating the construction of a favorable self-image, as a person able to create information, to detect differences, facts, problems and new ideas, in order to act according to well-defined values and criteria”(Todor, O., 2014, 27 - 28 ).

The implementation of the Instrumental Enrichment Program in practice involves the use of a number of 14 instruments with controllable values in achieving the above objective and sub-objectives. The tools include pencil-paper tasks targeted toward specific cognitive areas such as analytical perception, spatial orientation, comparative behavior, classifications, and more. The program is mediated by a certified mediator and can be carried out collectively, in individual meetings or in remedial activities. Task mastery is not about learning by memory or just about reproducing a learned skill. Therefore, the Instrumental Enrichment Program systematically strengthens cognitive functions that allow learners to define problems, make connections, and identify relationships, develop intrinsic motivation, and improve skills. (Todor, Dughi, Dughi, 2021)

The fourteen tools focus on specific cognitive functions. The process of learning how to learn takes place through repetition, not only through the repetition of the tasks of the program itself, but through the repetition of cognitive functions that allow the individual to think effectively. Tasks increase in complexity and level of abstraction, and tools strengthen cognitive functions in a cyclical form. Tasks are deliberately transferable to any life situation. Through the mediated learning program, students learn to develop their ability to apply their cognitive functions to any problem or thinking situation.

## **2. Objectives and hypotheses of the experimental study**

The study aims to demonstrate that by using the tools included in the instrumental enrichment program and applying the principles of mediated learning in specific activities with pre-adolescent children can increase their confidence in their own abilities to mobilize the cognitive and motivational resources needed to meet success of goals in general and schoolwork in particular. The approach was also designed to reduce the effects of the social measures during the pandemic on learning. Isolation, online learning, changing learning rhythm have produced effects that can be reduced by their awareness and learning efforts (Maier, 2021, Roman et al., 2020). The assumptions are as follows:

- The use of the Feuerstein Method improves the perception of self-efficacy;
- The use of the Feuerstein Method leads to an increase in confidence in one's ability to influence school performance.

## **3. Participants**

The experimental study was conducted on a number of 40 children, with specific ages of pre-adolescence, respectively between 10-14 years. The group is divided into two distinct groups, namely the experimental group (20 subjects) and a control group (20 subjects). The children who form the experimental group come from a number of 11 schools in Timișoara, being students in middle school classes. The agreement for the participation of the children included in the study was requested and received from the parents / guardians of the minors. The structure of the two groups was homogeneous in age, respectively a total of 10 children of 10 years, 6 children of 11 years, 8 children of 12 years, 8 children of 13 years and 8 children of 14 years divided equally between the two groups.

## **4. Tools and methods used in the study**

In the experimental study we started from the application of all children, both in the control group and in the experimental group of the

following questionnaires:

#### Locus of Control – Rotter Scale

The Rotter questionnaire consists of 40 closed-ended questions with Yes / No answers that are answered according to the preferences of each respondent. Of these, 24 are directly rated and 16 are reverse rated. A high score obtained ( $> 15$ ) means a locus of external control associated with a high level of stress, the respondent having a strong belief that events exceed his ability to control, without identifying a causality between his own behavior and results. A low score obtained ( $< 7$ ) means a locus of internal control associated with an increased tolerance to stress, the respondent having a strong belief that the results of the actions are strongly influenced by their own behavior and effort. This dimension of personality is related to efficiency in activity and learning. (Dughi, Ignat, 2018).

#### Scale of personal self-efficacy – Bandura

The scale developed by Bandura (2006) and applied in this experimental study includes 10 items of statements with the following answer options: 1 = never, 2 = sometimes, 3 = often, 4 = always. These statements include attitudes that the subject may take in the face of a difficult situation, and the answer is how to act in general. The interpretation summarizes the scores obtained, a low score obtained ( $< 21$ ) represents a feeling of low self-efficacy, and a high score obtained ( $> 30$ ) represents a feeling of high self-efficacy.

### **5. Carrying out the experimental study**

There were organized and conducted twelve 90-minute Mediated Learning workshops between October 2020 and February 2021. Prior to this learning approach, all children, both in the control group and in the experimental group, were tested with the two tests described above. The tests were conducted individually and collectively face to face. The children in the study group were divided into two working groups, following a criterion of homogeneity according to age and school level.

Due to the restrictions imposed by the pandemic during this period, the workshops could not be organized weekly, with quarantine situations occurring among the children's families, which led to the suspension of the workshops for 14 days each. We consider that the possibility of organizing the workshops continuously during 12 weeks could have determined more differentiated results between the experimental group and the control group.

The tools used in the workshops were:

- Organization of Dots - Standard level I - a number of 18 worksheets
- Instructions - Standard level II - a number of 30 worksheets

The choice of these tools was based on the specific objectives of each instrument and the concurrence of these objectives with those of this study. Thus the individual objectives of the applied instruments are:

- Providing opportunities to perform a series of cognitive operations: hypothetical thinking, inferential thinking, hypothesis formation;
- Development of an intrinsic system of habits to repeat tasks that are essentially similar, with the aim of improvement;
- Encourage intrinsic motivation by successfully solving challenging tasks;
- Promoting independence of action by referring to internal references;
- Develop one's own ability to self-regulate independently and completely (Feuerstein, R. 1995).

*Organization of Dots* - this tool proposes the design of virtual relationships through tasks that require individuals to identify and discover different figures by joining a set of points. Designing a special relationship involves the learner searching between what appear to be separate phenomena. Through repeated practice and the success of solving increasingly complex tasks, the tool encourages the development of intrinsic motivation and activates a number of cognitive functions. The cognitive functions developed by applying this tool are: defining the problem, selecting the points that are relevant to the figure sought, planning the behavior, hypothetical thinking and the use of logical evidence, summative behavior.

*Instructions* - The Instructions tool focuses on encoding and decoding verbal and written information. The difficulty of the tasks is not given by the meaning of the words themselves, although sometimes students may encounter problems with unknown terms; the difficulty lies in understanding the meaning of the words and what they imply in the given context. By understanding the reasons that lead to the success or failure of their actions, students are transformed into information generators, able and willing to transmit complex instructions. The cognitive functions developed are: problem definition, comparison of drawings with verbal instructions, use of relevant aspects to clarify ambiguities, hypothetical thinking and use of logical evidence to support hypotheses.

Following the completion of the workshops, both the children in the control group and the children in the working group were tested with the following tests: Self-efficacy Scale and Locus of Control Scale, followed by a comparative analysis of the results obtained.

## **6. Statistical analysis of comparative results**

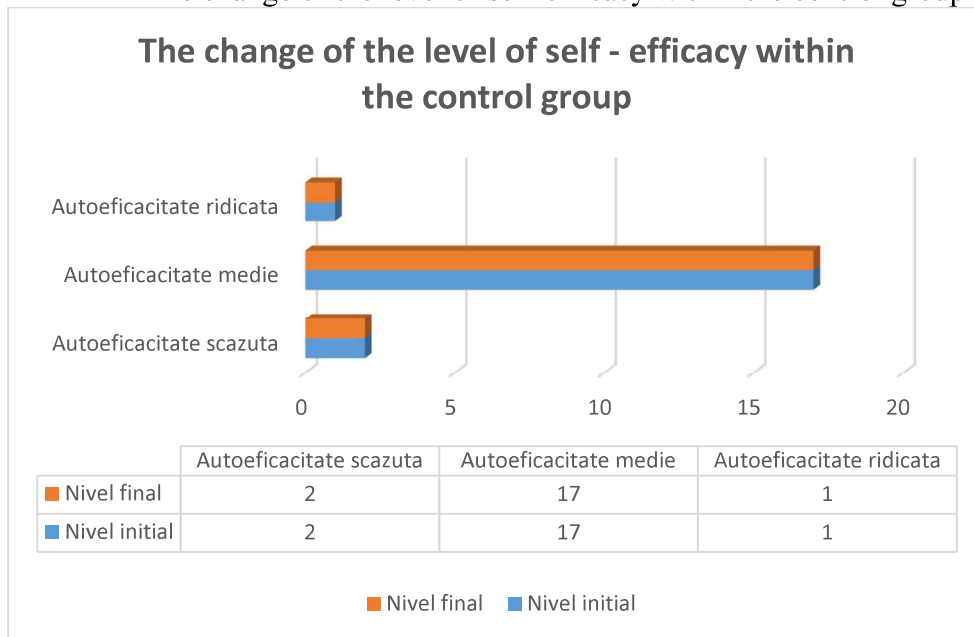
The data from the study were centralized and statistically analyzed to verify the confirmation of working hypotheses. In the analysis of statistical data, the two working groups were numbered differently, respectively 1 - study group and 2 - control group. The next step involves verifying the confirmation of the initially established assumptions. For testing the first three

hypotheses we used the T-Test in SPSS, which represents any test of statistical hypothesis in which the test statistic follows a T distribution of Student under the null hypothesis. Given the need to compare the results of the two groups obtained, the chosen form was Independent samples T-Test. This form of the T-test allows the comparison of the average value obtained from two data sets, in order to verify the confirmation of some expected values.

*Hypothesis 1 - The use of the Feuerstein Method improves the perception of self-efficacy*

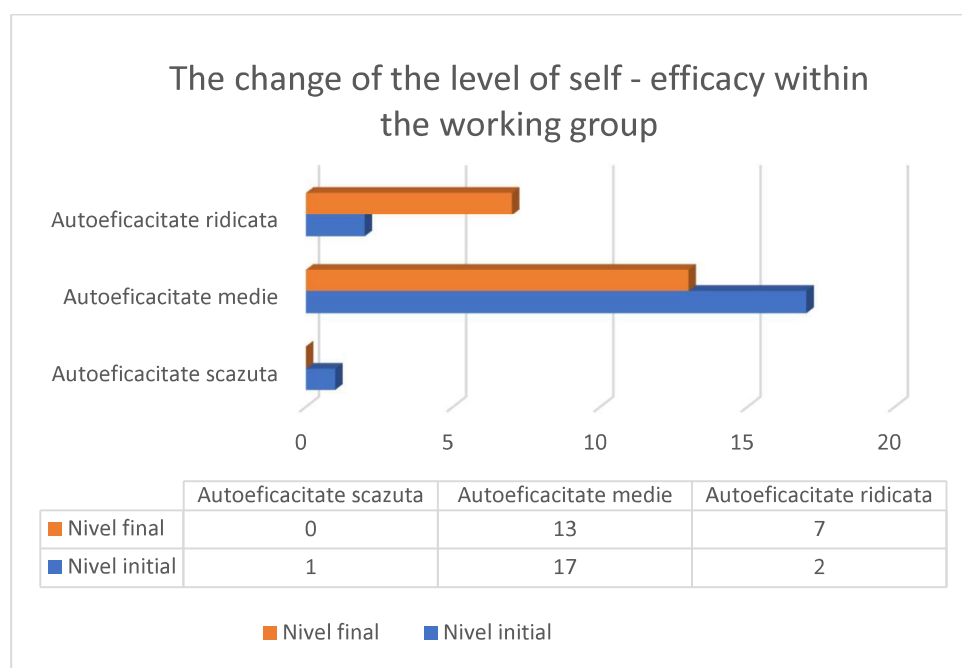
If we analyze first of all the individual results obtained by the children and the classification of these results in the three intervals described by Bandura, we notice the following:

- within the control group we notice that there was no change regarding the classification at different self-efficacy levels - Fig. 1  
The change of the level of self-efficacy within the control group



*Figura 1 The change of the level of self-efficacy within the control group*

- within the working group there is a significant change in the classification of children at the three levels of self-efficacy, so 1 child increases from low self-efficacy to medium self-efficacy, and 5 children increase from medium self-efficacy to high self-efficacy according to Figure 2 –The change of the level of self-efficacy within the working group



*Figura 2 The change of the level of self-efficacy within the working group*

In the application of the T-Test in SPSS, the independent variables are defined, respectively the two groups of copies and the dependent variables, respectively the values obtained following the application of the Personal Self-efficacy Scale. The results obtained are those highlighted in Table 1 - Average value in the analysis of self-efficacy:

**Group Statistics**

	Grup	N	Mean	Std. Deviation	Std. Error Mean
Initial Value Self-efficacy	1	20	25.90	3.837	.858
	2	20	24.60	4.122	.922
Subsequent Value Self-efficacy	1	20	28.45	3.980	.890
	2	20	24.75	3.985	.891

*Table 1 - Average value in the analysis of self-efficacy*

In this analysis it can be seen in the initial assessment the achieving of an average value of 25.90 in the case of the working group and an average of 24.60 in the case of the control group. The difference in the initial mean value between the two groups is 1.3. In the evaluation of the final scores obtained, it is observed the achieving of an average value of 28.45 for the control group and an average value of 24.75 for the control group. The difference in the final mean value between the two groups is 3.7. This means a more pronounced



increase in the sense of self-efficacy in the working group than in the control group.

In the case of the group working with the instruments specific to the Feuerstein Method, the level of self-efficacy increased by 9.85% compared to the control group in which the level of self-efficacy increased in the same reference period by 0.61%. We also notice an increase in the case of the second group, most probably determined by various subjective factors that appeared during the reference period. Analyzing the individual values obtained, the largest increases in the level of self-efficacy were manifested in children aged 14 years, respectively 37% and 34%. Also, the highest increases in the level of self-efficacy were obtained in children who had initially recorded lower measured values.

In order to further analyze the validity of the result obtained, we consider the results obtained in Table 2.

		Independent Samples Test								
		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
								Lower	Upper	
Scor initial AE	Equal variances assumed	.348	.559	1.032	38	.308	1.300	1.259	-1.249	3.849
	Equal variances not assumed			1.032	37.807	.308	1.300	1.259	-1.250	3.850
Scor ulterior AE	Equal variances assumed	.140	.710	2.938	38	.004	3.700	1.259	1.151	6.249
	Equal variances not assumed			2.938	38.000	.004	3.700	1.259	1.151	6.249

Table 2 Statistical values - T Test Self-efficacy

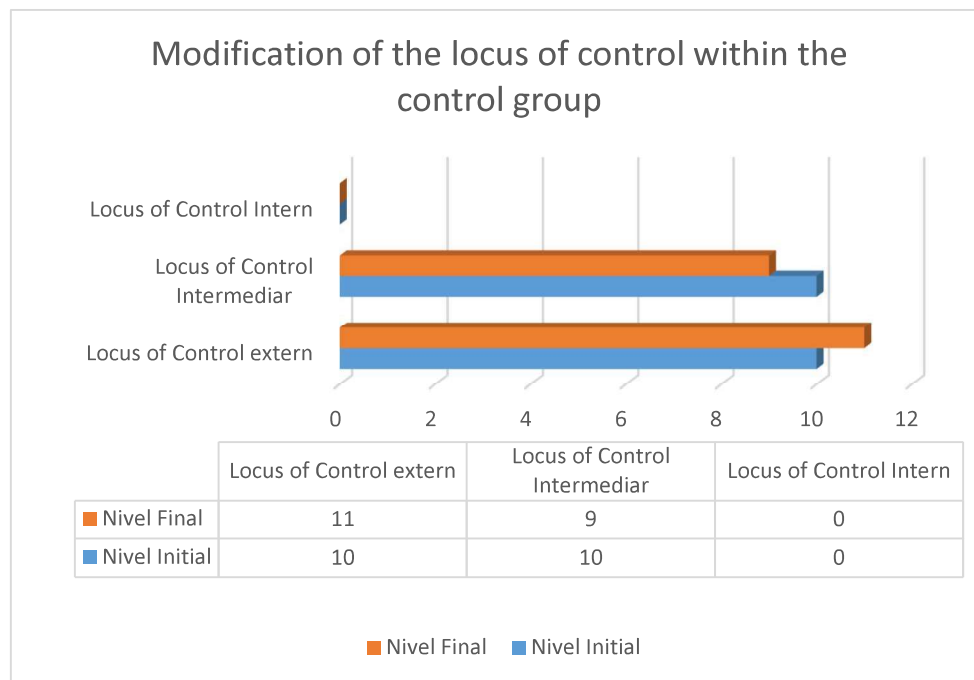
Analyzing the data obtained above we notice that in the initial situation, the difference between the two groups was not relevant obtaining Levene's Test for Equality of Variances = 0.348,  $F > 0.05$  and Sig. (2 - tailed) = 0.308,  $p > 0.05$ , while in the case of the scores obtained after the experimental study, the results of the statistical analysis are Levene's Test for Equality of Variances = 0.140,  $F > 0.05$  and Sig. (2 - tailed) = 0.004,  $p < 0.05$ .

Following the statistical analysis above, it is observed that the first hypothesis of the study is confirmed, respectively after participating in the Feuerstein instrumental enrichment workshops, preadolescents show a significantly higher level of self-efficacy compared to children who were not included in this program.

*Hypothesis 2 - Using the Feuerstein Method leads to increased confidence in one's ability to influence school performance*

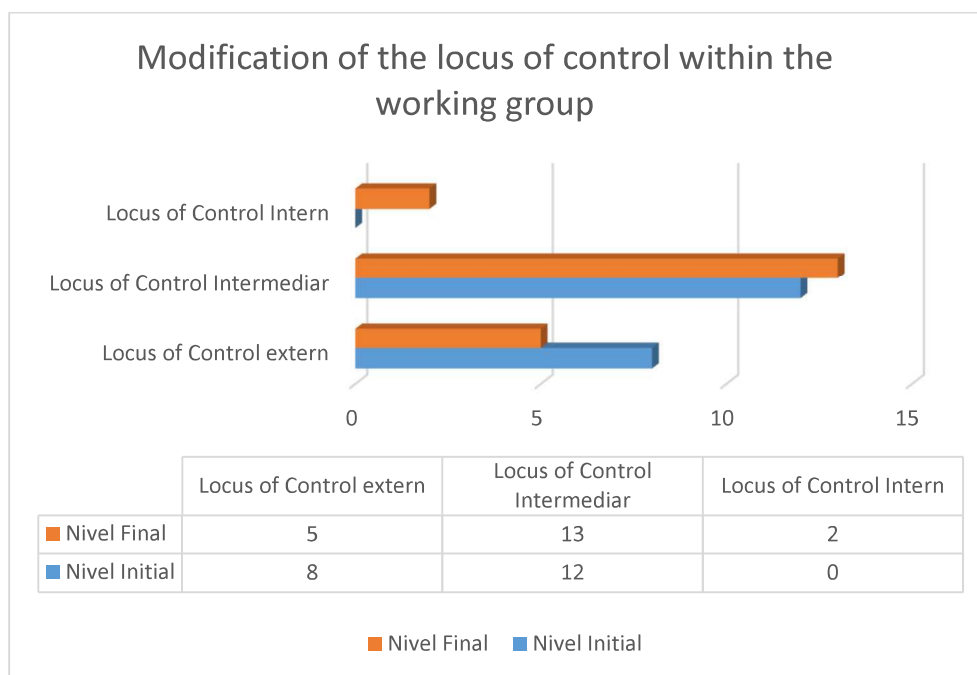
Analyzing the way in which the level of internalization of the control locus for the two groups of children changes during the reference time period, the following can be observed:

- Within the control group there is only one change in the level of the control locus, according to Rotter's scale, in the sense of its externalization and the transition from an Intermediate Locus of Control to an External Locus of Control as can be seen in figure below. It is also observed that no child manifests a locus of internal control.



*Figure 3. Modification of the locus of control within the control group*

- Within the study group we can see several changes in the level of the locus of control, according to the Rotter scale, respectively 3 children show a transition from External Locus of Control to an Intermediate Locus of Control, and 2 other children show a transition from Intermediate Locus of Control to Internal Control Locus, provided that no child with Locus of Internal Control was initially identified in this category either. The data can be seen in Figure 4 - Modification of the locus of control within the working group.



*Figure 4 - Modification of the locus of control within the working group.*

In order to verify this hypothesis, we applied the T test. In defining the variables, the two groups of children were considered independent variables, and the dependent variables were the results obtained after applying the Locus of Control Scale. The following results were obtained in the analysis of the average value, according to Table no.3:

#### Group Statistics

Grup	N	Mean	Std. Deviation	Std. Error
Scor initial1 Locus of Control <sub>2</sub>	20	14.30	3.045	.681
Scor ulterior1 Locus of Control <sub>2</sub>	20	15.55	3.137	.701
Scor initial1 Locus of Control <sub>2</sub>	20	12.70	3.757	.840
Scor ulterior1 Locus of Control <sub>2</sub>	20	15.65	2.961	.662

*Table no.3 Average value in locus of control analysis*

Analyzing the above data, it is observed in the initial evaluation it was obtained an average value of 14.30 in the case of the working group and an average value of 15.55 in the case of the control group. The difference between the two initial average values is 1.25, indicating a higher orientation towards

the external control locus in the case of the control group. In the analysis of the final scores obtained, the average value of 12.70 is observed for the study group, that is a decrease of the score obtained in the sense of internalizing the control locus by 11.19%, and in the case of the control group an average final value of 15.65 is observed, that is an increase of the score obtained in the sense of accentuating the exteriorization of the control locus by 0.65%. These results mean that in the absence of an approach to the principles of mediated learning, there is an increase in the values obtained, meaning a decrease in confidence in one's own ability to influence school performance in particular and life events in general. At the same time, in the case of children participating in mediated learning activities, there is a decrease in the scores obtained, respectively an increase in their own ability to influence their own destiny and school performance in particular.

In order to validate the obtained result, the statistical results obtained below and exemplified in Table no. 4 are analyzed.

*Table no. 4 - Locus of Control statistical values*

Analyzing further the statistical values we notice that initially, the difference between the two groups was not relevant, having the coefficient

Independent Samples Test										
		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Scor initial LC	Equal variances assumed	.118	.734	-1.279	38	.209	-1.250	.978	-3.229	.729
	Equal variances not assumed			-1.279	37.967	.209	-1.250	.978	-3.229	.729
Scor ulterior LC	Equal variances assumed	1.714	.198	-2.758	38	.009	-2.950	1.070	-5.115	-.785
	Equal variances not assumed			-2.758	36.030	.009	-2.950	1.070	-5.119	-.781

Levene's Test for Equality of Variances = 0.118,  $F > 0.05$  and Sig. (2 - tailed) = 0.209,  $p > 0.05$ , and in the case of the scores obtained after the study, the statistical values show a coefficient Levene's Test for Equality of Variances = 1.714,  $F > 0.05$  and Sig. (2 - tailed) = 0.009,  $p < 0.05$ , which determines the relevance of the comparison between the two groups.

Following the analysis of the above data, it can be concluded that the second hypothesis of the study is confirmed, respectively following the participation in instrumental enrichment workshops by the Feuerstein method, among preadolescents can be seen an improvement in faith in their own

abilities of influencing school performance, while in the case of preadolescents who were not included in the study, there is even a decrease in this belief in the same reference period.

### **Conclusions**

We chose to conduct this study based on the desire to support pre-teens by developing skills designed to ease their daily challenges. Greater confidence in one's own abilities and abilities are scientifically proven to be essential in achieving educational goals and more. Also, the sustained belief in the ability to determine the results of actions is an important element in creating intrinsic motivation that will lead to success and academic success. In order to mediate the learning and experimentation of the instrumental enrichment program, we applied 2 of the 14 instruments of the program, characterized by the convergence of the objectives of their use with those of the present study. Thus, by conducting learning workshops mediated by the Feuerstein method and using the tools Organizing of Dots and Instructions we aimed in particular to develop the characteristics of intrinsic motivation for learning, encouraging independence and confidence in the results obtained through own effort, but also creating a framework for social interaction with children with similar ages and interests at a time when such school interaction was restricted.

It was found that by participating in the instrumental enrichment program increases the level of self-efficacy of students, respectively their confidence in their own ability to produce the desired level of performance both at school and beyond. At the same time, by regularly and consistently applying the principles of mediated learning in direct interaction with preadolescents, one can observe an influence of the location of the control locus and an increase in self-confidence that they can directly influence school performance.

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