# STUDY ON THE NEED TO UPDATE THE RESEARCH REGARDING THE BIOMOTOR POTENTIAL OF MIDDLE SCHOOLERS

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**Abstract**

School conditions are greatly modified in relation to the ones experienced by the previous generations. Mandatory school period was extended up to 16 years old. This study started from the observation that many physical education teachers in Bacau county still use the 1976 created SUVA system to assess their pupils. This paper aims to highlight the need for a national study regarding the measurement of the current biomotor potential of the Romanian school population, a study that could reveal the true face of the motor and physical development of children today.

This was an observational experiment without an independent variable, done by comparing the data gathered from measurements with the data from the professional literature, the ones provided by the MER as standards for the current physical education evaluation of pupils.

The results of the research proved that the pupils from the Elena Cuza Middle School are behind the current standards, but this author's belief is that, in reality, the standards must be updated, in accordance to the pupils' diet and mentality.

This study has a pronounced warning signal in regards to the way in which the Romanian middle school population is developing, from a psychomotor point of view. This study could be continued also with a sociological research that would emphasize the causes leading to a decrease in the biomotor potential, and it would identify the pathways to attract children toward exercise.

**Key words:** biomotor potential, pupils, middle school

### 1. Introduction

The structural transformations that are taking place in the entire modern society determines a new analysis of the role played by the educational process in physical education, as a base to form the pupils' personality, in complete concordance with the increasingly varied demands of the educational ideal.

The quick adaptation to frequent changes, the acceleration of life rhythms has led to a reconsideration of the importance of physical education in schools as a fundamental side of general education. Meeting the parameters of the middle school physical education model became an objective necessity (Mocanu, G., 2015).

School conditions are greatly modified in relation to the ones experienced by the previous generations. Mandatory school period was extended up to 16 years old. More than half of the school population at the end of primary school encounters difficulties in understanding the significance of written texts. This situation gets worse as the technology evolves. Getting diplomas becomes increasingly difficult, and so is getting jobs. (Ababei, R.,)

This study started from the observation that many physical education teachers in Bacau county still use the 1976 created SUVA system to assess their pupils. The values recommended by the system are referring, obviously, to the biomotor potential from 42 years ago, and the grades of the pupils are increasingly lower, or are artificially increased by some of the teachers.

This assessment system, albeit valid in its time, does nothing but decrease the children confidence in their own abilities, at the same time increasing the number of medical excuses, because many of today's children can "ruin their high school admission grade" through the low grades gotten in physical education, despite their best efforts.

### 2. Objectives

This paper aims to highlight the need for a national study regarding the measurement of the current biomotor potential of the Romanian school population, a study that could reveal the true face of the motor and physical development of children today.

This paper aims to be a pilot study for a national research, trying to be a warning signal in regards to the way in which the Romanian middle school population is developing, by observing a well determined group - the pupils of the "Elena Cuza" School of Piatra Neamt.

### 3. Research Hypotheses

This experiment started from the following hypotheses:

1. The official reference data regarding the biomotor potential of the Romanian middle school population does not correspond anymore to the objective reality, this data needing an update, for a better assessment of the children.
2. The development of modern society has brought, besides the benefits of computers and cybernetics, also a considerable decrease in the amount of time that young people spend exercising, this having serious consequences on their health.

### 4. Development of the research

This was an observational experiment without an independent variable, done by comparing the data gathered from measurements with the data from the professional literature, the ones provided by the MER as standards for the current physical education evaluation of pupils.

The experiment was conducted on four groups - grades fifth to eighth, comprising 60 pupils.

The anthropometric data of the children were compared to the reference values in the assessment system, thinking that their somatic development is an important indicator of their health and nutrition.

The values of the children's biomotor potential were recorded in the months of September 2016 and May 2017, the data presented in the tables being the rounded average between the two tests. This study tried through this procedure to focus the research on the general component and less on the particular one, then making comparisons with the data in the professional literature - the data comprised in the assessment standards of the MER, which were based on the 1990 biomotor potential of the population.

The arithmetical mean was calculated, as well as the standard deviation and the variability coefficient for each indicator, but the comparison with the data in the professional literature could be done only through the average, found also in the national study. Table 1 presents the results recorded for the fifth grade.

Table 1 Test results - 5th grade

| No | Indent | Height | Weight | Quet | Pabd | Span | LFE | RTR | Speed | End. | AMO |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1. | RUBEN | 142 | 38.7 | 71 | 61 | 145 | 150 | 23 | 9.12 | 3:40 | 23 |
| 2. | MIRAB | 138 | 54.9 | 73.5 | 77.5 | 135.5 | 95 | 13 | 11.4 | 2:45 | 31 |
| 3. | SERGI | 148 | 50 | 74 | 80 | 146.5 | 100 | 19 | 11.0 | 2:47 | 27 |
| 4. | BRIAN | 153 | 38.5 | 75 | 58.5 | 151 | 160 | 28 | 8.6 | 2:40 | 24 |
| 5. | CAMEL | 163 | 47 | 81 | 61 | 158 | 135 | 25 | 9.11 | 3:15 | 32 |
| 6. | HANA | 136.5 | 39 | 71.5 | 57 | 135.5 | 115 | 21 | 8.97 | 2:41 | 33 |
| 7. | ALEX | 153 | 46.6 | 79.5 | 64.5 | 146.5 | 190 | 21 | 8.05 | 2:36 | 30 |
| 8. | ANDRE | 138 | 39.6 | 68 | 69.5 | 142 | 95 | 23 | 9.5 | 2:51 | 28 |
| 9. | ALEX | 144 | 33.4 | 70 | 55 | 141 | 160 | 21 | 9.2 | 3:38 | 18 |
| 10. | EDWAR | 147.5 | 56.1 | 76 | 81 | 150.5 | 115 | 19 | 10.8 | 3:56 | 29 |
| 11. | ANAMA | 162 | 39.5 | 79 | 56.5 | 162.5 | 160 | 27 | 9.2 | 2:39 | 25 |
| 12. | ALINA | 142.5 | 30.6 | 70.5 | 56 | 152.5 | 150 | 24 | 9.1 | 2:54 | 34 |
| 13. | LAVIN | 170 | 46.2 | 84.5 | 58 | 163.5 | 155 | 23 | 9.8 | 3:39 | 29 |
| 14. | DENIS | 140 | 43.7 | 71.5 | 69 | 143 | 90 | 16 | 10.2 | 3:20 | 15 |
| 15. | RAUL | 162 | 91.8 | 84.5 | 102 | 166.5 | 100 | 12 | 11.6 | 3:47 | 11 |
| | Average | 157.3 | 46.3 | 73.2 | 71.2 | 149.3 | 131.3 | 21 | 9.7 | 3:20 | 25.9 |
| | Standard 10 | X | X | X | X | X | 1.65 | 23 | 8.4 | 3.12 | 20 |
| | Deviation | 12.6 | 13.9 | 5.2 | 18.4 | 9.44 | 30.5 | 4.47 | 1.03 | 0.02 | 6.5 |
| | vc | 8.01 | 30 | 7.12 | 25.8 | 6.32 | 23.2 | 21 | 10.6 | 0.62 | 25 |

For a better interpretation, figure 1 presents the results recorded by the subjects during the control challenges, compared to the standards of the national assessment system.
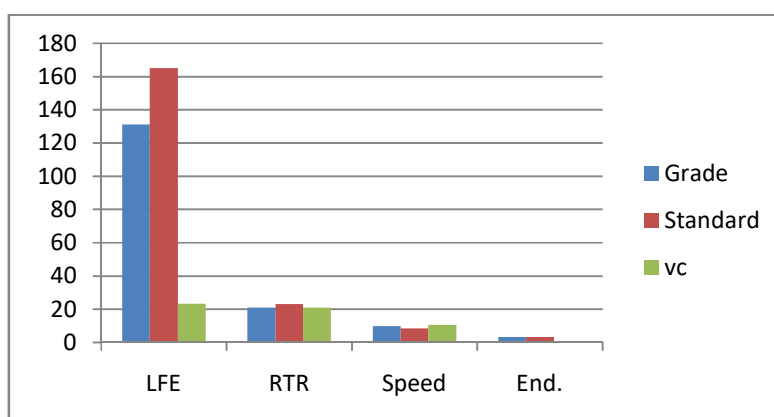
Figure 1. Comparative chart between the reference values, the recorded values and the variability coefficient - 5th grade

The data analysis reveals that all of the indices registered variability coefficient of up to 30%, which for a teaching process makes one think of a wide spread, but there are indices, especially the motor ones, with values around 20%, proving that the group is taught correctly; however the recorded values are below the national standards, the long jump without running and the core lifting values being the most conclusive, significant differences being recorded.

It can be observed, though, that for the oina ball throw challenge, the average is above the requirements of the national assessment system.

The somatic development recorded here is within the general standards found in the foreign professional literature, Romania lacking a current study on this subject; however, one can notice even from the fifth grade, a tendency for overweightness among pupils.

Table 2 presents the results recorded by the sixth grade.

Table 2. Test results - 6th grade

| No | Indent | Height | Weight | Quet | Pabd | Span | LFE | RTR | Speed | End. | AMO |
|----|--------|--------|--------|------|------|------|------|-----|-------|------|-----|
| 1. | RADU | 153 | 50 | 46 | 62 | 151 | 160 | 23 | 8.7 | 3:40 | 23 |
| 2. | BOGDA | 149 | 28 | 40 | 89 | 149 | 114 | 16 | 9.8 | 2:45 | 31 |
| 3. | DAMAR | 159 | 67 | 80 | 81 | 131 | 130 | 19 | 10.2 | 2:47 | 27 |
| 4. | PAVEL | 1.5 | 41 | 75 | 62 | 145.5 | 100 | 19 | 7.3 | 2:40 | 24 |
| 5. | BOGDA | 163 | 57 | 77.5 | 75 | 167 | 127 | 20 | 9.7 | 3:15 | 32 |
| 6. | JORDI | 144 | 35 | 71 | 65 | 141 | 177 | 23 | 8.7 | 2:41 | 33 |
| 7. | LORED | 156 | 60 | 79 | 79 | 151 | 131 | 14 | 10.0 | 2:36 | 30 |
| 8. | DANIE | 161 | 77 | 79.5 | 94 | 166 | 100 | 10 | 11.0 | 2:51 | 28 |
| 9. | ALEXI | 160 | 69 | 84 | 76 | 156 | 90 | 12 | 7.0 | 3:38 | 18 |
| 10. | MARIU | 162 | 87 | 80 | 99 | 158 | 110 | 14 | 10 | 3:56 | 29 |
| 11. | DANI2 | 148 | 59 | 74 | 84 | 154 | 120 | 15 | 11.0 | 2:39 | 25 |
| 12. | GICĂ | 144 | 71.5 | 71.5 | 59 | 139 | 140 | 21 | 9.1 | 2:54 | 34 |
| 13. | ȘTEFA | 149 | 38 | 71.5 | 64 | 152 | 120 | 16 | 8.6 | 3:39 | 29 |
| 14. | MIHAE | 156 | 51 | 75 | 71 | 158.5 | 137 | 12 | 10.0 | 3:20 | 15 |
| 15. | VASI | 144 | 77 | 71 | 76 | 141 | 101 | 10 | 10.0 | 3:40 | 18 |
|  | Average | 143.3 | 57.8 | 71.6 | 75.7 | 150.6 | 123.8 | 16.2 | 9.4 | 3:08 | 26.4 |
|  | Standard 10 | X | X | X | X | X | 170 | 24 | 8.2 | 3.15 | 21.5 |
|  | Deviation | 38.4 | 16.7 | 11.9 | 11.8 | 9.6 | 22.7 | 4.2 | 1.1 | 0.01 | 5.6 |
|  | vc | 26.7 | 28.8 | 16.6 | 15.5 | 6.3 | 18.3 | 25.9 | 13.41 | 0.32 | 21.2 |
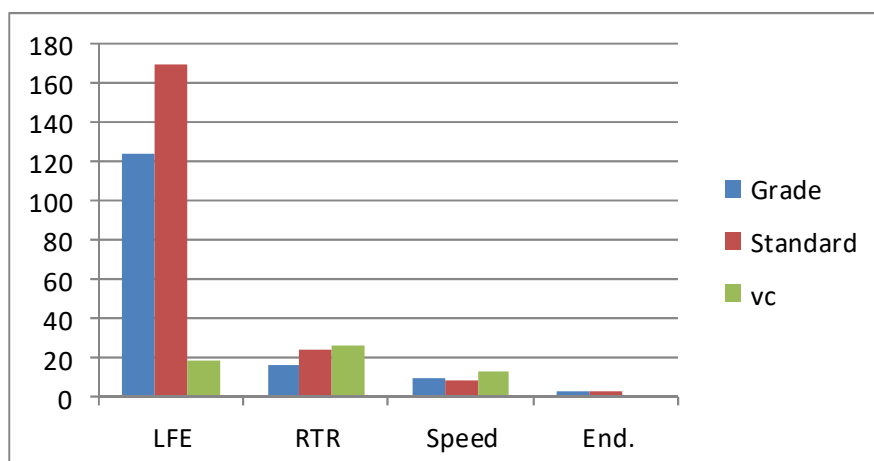
Figure 2. Comparative chart between the reference values, the recorded values and the variability coefficient - 6th grade

The analysis of the results highlights a similarity to the fifth grade values, with major differences between the standard values and the pupils' potential. It can be noticed that although the recorded results are far from the requirements, the variability coefficients from the motor challenges indicate a low spread, emphasizing another time that this group was taught correctly, but the motor capacity of the pupils does not allow them to reach the required standards. Table 3 presents the results recorded by the seventh grade.

Table 3. Test results - 7th grade

| No | Indent | Height | Weight | Quet | Pabd | Span | LFE | RTR | Speed | End. | AMO |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1. | ANDRE | 158.5 | 57 | 79 | 79 | 159 | 124 | 17 | 9.8 | 3:40 | 20 |
| 2. | DAN | 156 | 36.7 | 73 | 81 | 131 | 124 | 19 | 10.2 | 2:35 | 30 |
| 3. | BOGDA | 167 | 87.9 | 73 | 75 | 176 | 127 | 20 | 9.7 | 2:57 | 25 |
| 4. | RALUC | 1.52 | 60 | 79 | 79 | 151 | 131 | 14 | 10.0 | 2:40 | 28 |
| 5. | DANIEL | 156 | 60.3 | 79.5 | 94 | 166 | 100 | 10 | 11.0 | 3:25 | 30 |
| 6. | DORIN | 156.5 | 59.9 | 80 | 81 | 152 | 174 | 16 | 9.6 | 2:47 | 35 |
| 7. | ADRIA | 158 | 39.6 | 77.5 | 58 | 156 | 135 | 15 | 7.2 | 4:18 | 17 |
| 8. | ADRIAN | 138 | 27 | 69 | 51 | 140 | 155 | 16 | 8.0 | 3:58 | 20 |
| 9. | ADINA | 159 | 43 | 82 | 64 | 161 | 130 | 16 | 8.7 | 2:56 | 18 |
| 10. | MARIUS | 158 | 42 | 82 | 69 | 155 | 150 | 21 | 9.1 | 2:34 | 37 |
| 11. | VALEN | 163 | 65 | 85 | 73 | 163 | 130 | 16 | 10.0 | 3:49 | 20 |
| 12. | ALEX | 170 | 47 | 85 | 58 | 156 | 135 | 15 | 6.8 | 3:25 | 44 |
| 13. | FLORIN | 156 | 57 | 79 | 79 | 159 | 124 | 16 | 8.7 | 3:31 | 35 |
| 14. | ANDA | 156 | 39 | 73 | 81 | 131 | 111 | 16 | 9.1 | 3:41 | 17 |
| 15. | FLORI | 162 | 86 | 73 | 75 | 176 | 105 | 21 | 8.8 | 3:12 | 20 |
| | Average | 147.7 | 53.8 | 77.9 | 73.1 | 155.4 | 130. | 16.5 | 9.1 | 3.17 | 26.4 |
| | Standard 10 | X | X | X | X | X | 1.75 | 25 | 8.8 | x | 23 |
| | Deviation | 39.6 | 16.7 | 4.6 | 10.8 | 13.0 | 18.2 | 2.7 | 1.09 | 0.02 | 8.2 |
| | vc | 26.8 | 31 | 5.9 | 14.7 | 8.3 | 14 | 16.3 | 11.9 | 0.6 | 31 |

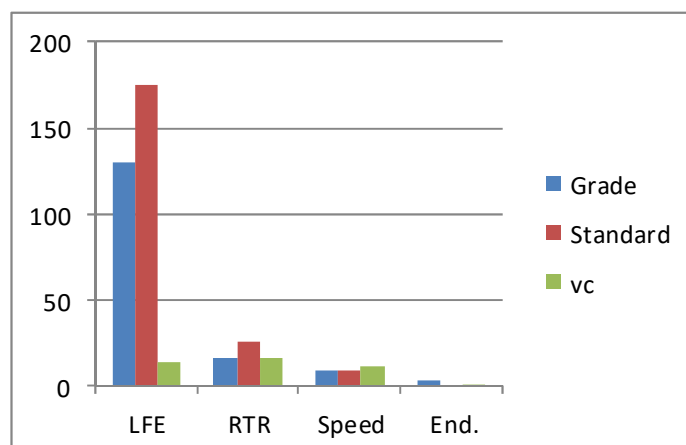Figure 3 presents the interpretation of the recorded results:

Figure 3. Comparative chart between the reference values, the recorded values and the variability coefficient - 7th grade

The analysis of the figure above highlights the fact that the biomotor potential decreases with age, the children having an increased difficulty in facing the demands imposed by the national assessment system, a good example being the core lifting values, emphasizing the sedentary lifestyle of many pupils and the need for more physical education lessons, at least three times per week, in order for them to benefit from the cumulative effect of adaptation.

Table 4 presents the results recorded for the eighth grade.

Table 4.Test results - 8th grade

| No | Indent | Height | Weight | Quet | Pabd | Span | LFE | RTR | Speed | End. | AMO |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1. | OANA | 154.4 | 44 | 79 | 64 | 154 | 130 | 23 | 8.7 | 3:40 | 18 |
| 2. | ALINA | 153 | 45 | 80 | 61 | 157 | 140 | 16 | 9.8 | 2:35 | 30 |
| 3. | CRISTIAN | 167 | 71 | 88 | 81 | 131 | 130 | 19 | 10.2 | 2:57 | 35 |
| 4. | VIOREL | 153.5 | 45 | 75 | 62 | 145.5 | 100 | 19 | 8.3 | 3:15 | 30 |
| 5. | DAN | 161 | 42 | 77.5 | 75 | 167 | 127 | 20 | 9.7 | 2:37 | 37 |
| 6. | ALINA | 145.5 | 35 | 76 | 65 | 141 | 177 | 23 | 8.7 | 2:58 | 20 |
| 7. | CRISTINA | 149 | 55 | 80 | 79 | 151 | 124 | 14 | 10.0 | 3:48 | 22 |
| 8. | ADINA | 148 | 53 | 76 | 73 | 166 | 100 | 10 | 11.0 | 2:44 | 27 |
| 9. | MADALINA | 163 | 48 | 84 | 76 | 166 | 90 | 12 | 6.9 | 2:54 | 34 |
| 10. | ALIN | 158 | 53 | 80 | 99 | 158 | 110 | 14 | 7.0 | 3:23 | 26 |
| 11. | ANDREI | 155.5 | 77 | 84.5 | 84 | 154 | 120 | 15 | 11.0 | 3:43 | 20 |
| 12. | ALIDA | 167 | 84 | 88 | 92 | 172 | 135 | 12 | 9.1 | 3:44 | 20 |
| 13. | ADRIAN | 167 | 84 | 88 | 92 | 172 | 135 | 12 | 9.1 | 3:49 | 22 |
| 14. | MILENA | 156 | 51 | 79 | 92 | 172 | 140 | 21 | 9.1 | 3:59 | 17 |
| 15. | VASIL | 153 | 46 | 76 | 63 | 144 | 105 | 19 | 8.3 | 3:15 | 30 |
| | Average | 156.7 | 55.5 | 80.7 | 77.2 | 156.7 | 124.2 | 16.6 | 9.1 | 3.17 | 25.8 |
| | Standard 10 | X | X | X | X | X | 180 | 26 | 7.8 | x | 24.5 |
| | Deviation | 6.7 | 15.1 | 4.4 | 12.2 | 12.1 | 20.8 | 4.1 | 1.1 | 0.01 | 6.3 |
| | vc | 4.24 | 27.2 | 5.45 | 15.8 | 7.72 | 16.74 | 24.6 | 12 | 0.3 | 24.4 |

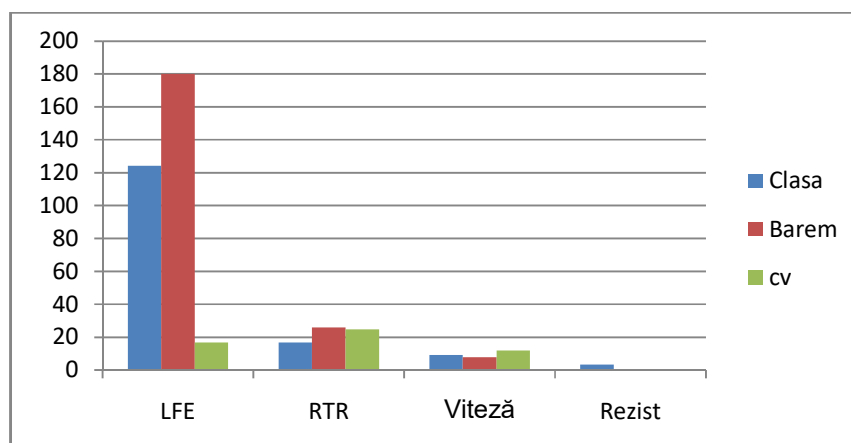Figure 4 presents the interpretation of the recorded results:

Figure 4. Comparative chart between the reference values, the recorded values and the variability coefficient - 8th grade

The analysis of figure 4 and table 4 shows a decreased homogeneity in the motor challenges, and an increase in the somatic-functional indices, which is explained largely by the end of puberty and the beginning of adolescence. With the exception of the oina ball throwing challenge, one can notice that the average does not meet the required standards demanded by the national physical education and sports assessment system.

### 5. Conclusions

The research has confirmed the working hypotheses as follows:

There really is a need for a national study regarding the biomotor potential of the school population that would take into consideration both the motor and the somatic indices of middle school pupils. The average values of the somatic indices revealed numbers over the Quetelet index, proving a tendency the pupils have, toward overweightness, and in some cases, even obesity.

The progress over time of the results reveal a decrease in the biomotor potential, so that when the pupils start middle school, they have a better potential than when they end their education cycle.

In regards to the motor indices, one can notice a drop in the pupils' potential with age, despite that the laws of growth and development suggest that this process should be the other way round.

One can also notice an accentuated drop in the segmental strength, especially in the upper limbs and abdominal muscles. Despite these values, one can observe results close to the national average for the oina ball throwing, which can be explained by the intense use of handball during the physical education lesson.

The results of the research proved that the pupils from the Elena Cuza Middle School are behind the current standards, but this author's belief is that, in reality, the standards must be updated, in accordance to the pupils' diet and mentality.

This study has a pronounced warning signal in regards to the way in which the Romanian middle school population is developing, from a psychomotor point of view. This study could be continued also with a sociological research that would emphasize the causes leading to a decrease in the biomotor potential, and it would identify the pathways to attract children toward exercise.

### References

1. Ababei, R. *Învăţare motrică şi sociomotrică*, ED. Alma Mater Bacău, 2003..
2. Badiu T. *Teoria educaţiei fizice şi sportului*. Galaţi: Mongabit, 2002.
3. Cerghit I. *Metode de învăţământ*. Bucharest: Didactică şi Pedagogică, 1997.
4. McArdle, W. et al. *Essentials of Exercise Physiology*. 2nd ed. Philadelphia: Lippincott Williams & Wilkins, 2000.
5. M.E.N şi C.N.C. *Curriculum naţional. Programe şcolare pentru clasele a V-a- VIII-a, Aria curriculară Educaţie fizică şi sport*. Bucharest: 1999.
6. M.E.N. *Sistemul Naţional Şcolar de Evaluare la disciplina educaţie fizică şi sport.* Bucharest: 1999.
7. Mocanu, G., Dezvoltarea calităţilor motrice în lecţiile de educaţie fizică din gimnaziu prin tratare diferenţiată, Ed. Ugal, Galaţi, 2015

8. Weineck J. *Fundamentele generale ale biologiei aplicate sportului la copiii şi adolescenţi.* Biologia sportului. Bucharest: M.T.S., C.C.P.S., 1994.